Eleventh Annual Review and Statistical Number

Electrical West

With which is consolidated the Journal of Electricity

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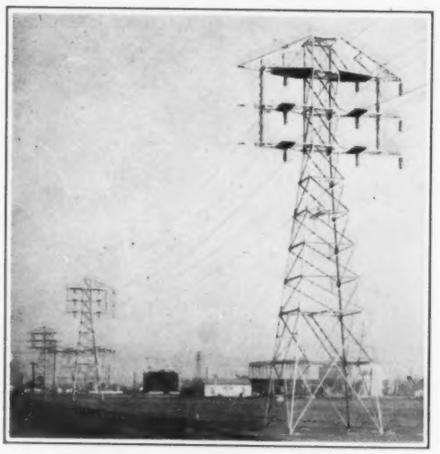
Multi-Circuit Towers
Permit Saving of Over 25%

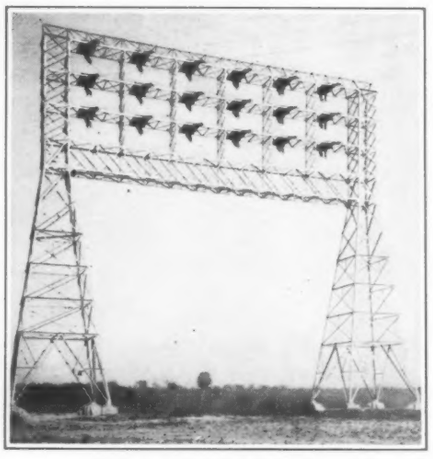
REMARKABLE economies claimed for multi-circuit tower lines have been proved by the Southern California Edison Company. Savings in cost of right-of-way, construction and maintenance on these structures were so outstanding that this utility is now using them almost exclusively on transmission lines in the vicinity of Los Angeles.

Towers carrying from four to fourteen 66 kv. circuits have been erected through developed industrial, residential and agricultural areas. Economies in initial and maintenance costs have been effected in every case.

All of these towers were manufactured by the Pacific Coast Steel Corporation. May our engineers and organization work with you in securing similar economies?



Four circuit 66-kv. towers showing economy of space and foundations.



Six circuit 66-kv. angle tower. Note protected runway providing access to all circuits.

A few major advantages of multi-circuit towers.

1. Saving of at least 25% in right-of-way.
2. Saving of approximately 10% in cost of steel.
3. Saving of 30% to 60% on cost of foundations.
4. Saving of lineman's time for inspection and maintenance.
5. Ideally adapted to conditions demanding get-away with large number of circuits through high-priced right-of-way areas.
6. Neater appearance offered by circuits and structures reducing objections from adjacent property owners.
7. Right-of-way used to better advantage.
8. Reduces hazard of contact with tower legs.
9. Bridge construction permits access to only cleared circuits as others are protected by locked gates.

May we send additional data?

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Subsidiary of Bethlehem Steel Corp.

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Plants
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General Office: Matson Bldg., San Francisco

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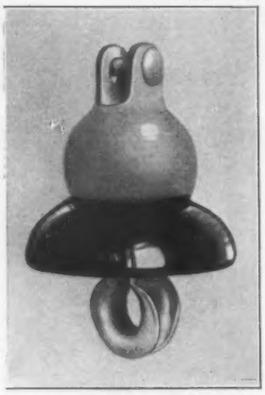

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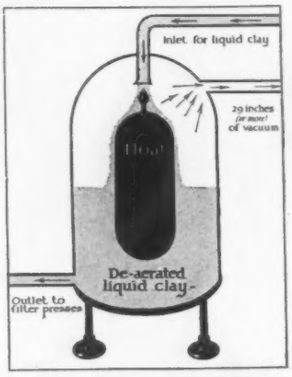

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With which is consolidated the Journal of Electricity
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Performance and Prospects

1929

EXPENDITURES for new facilities by the light and power companies of the West in 1929 reached the record total of $130,248,000. New generating capacity added during the year was comparatively small—only 202,000 kva.; the seven-year average is 357,090 kva. Distribution facilities required the major share of the expenditures, $56,029,000.

■ ■ ■

TWO NEW steam plants were completed, one in San Francisco and the second in Seattle. Increased efficiency and cheap oil and natural gas fuel are crowding hydro-electric power into the background even in this region where 80 per cent of the country's water power resources are located.

■ ■ ■

TOTAL generation required to meet the demands of the 3,120,674 customers in this territory was 16,480,084 kw.-hr. With only 12.7 per cent of the nation's customers this section produced 17.8 per cent of the country's energy. Deficient rainfall called for yeoman service from steam plants. Steam generated energy doubled in 1929. One-fourth of the total energy produced came from fuel-burning plants.

■ ■ ■

NEITHER antagonistic legislation nor radical agitation disturbed the progress of the power companies during 1929. There were a few local municipal ownership campaigns. The Federal Trade Commission investigation of the utilities sent several executives to Washington from this territory, and attracted some unfavorable publicity from the press. It is interesting to note how little space is being given to the rebuttal testimony being presented by the utilities in the press at the present time. Certain papers condemned the companies before they were tried; therefore the news value of the present testimony is gone.

1930

DEPRESSION has not affected the power companies' budgets for the current year in this territory. More money will be spent for new facilities than last year; the total is $137,821,000 for the Western states. Steam and hydro plants, distribution facilities and miscellaneous construction expenditures are all increased over 1929.

■ ■ ■

THIS WILL be another record year for new capacity with 471,490 kva. to come on the lines of the central stations. Fifty-four per cent will be in steam units. Enforced drought and economies resulting from a better balance of steam and hydro generating facilities are responsible for the high percentage of steam stations.

■ ■ ■

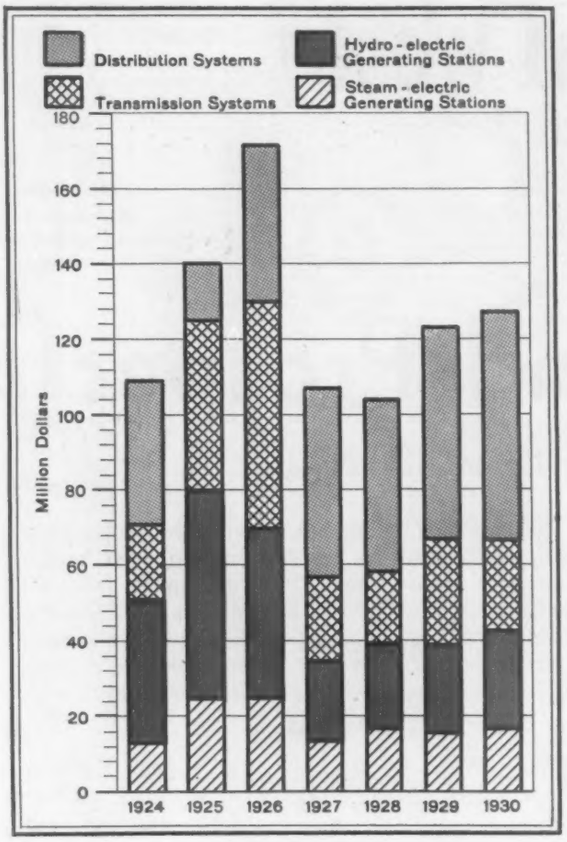
MORE RATE reductions are in the offing. There is much talk of mergers, some well founded, some idle speculation. If such mergers do develop, there is reason to believe that resulting economies will permit even lower charges to the public for energy.

■ ■ ■

THIS IS an election year in most Western states. Legislation antagonistic to the power companes has been proposed in the State of Washington. San Francisco may vote upon the acquisition of one or both of the distribution systems serving that city. Otherwise in so far as state and municipal ownership is concerned the horizon is clear.

■ ■ ■

WHAT about Boulder Dam and the Colorado River? Enabling legislation has become law yet there is little hope for early action in the development of this project. States' rights and states' fights have clouded a picture that has never been particularly bright. Nothing can be done until many points are settled, and the likelihood of early settlement seems remote.



Power Company Budgets Are Larger

RATE trends have continued downward, particularly for residential service. Inducement rates are in general use by practically all companies. The utilities have learned that rate reductions for the encouragement of greater use usually result in higher gross revenues. Despite these reductions gross revenue in this territory increased 7.2 per cent, reaching an estimated total of $266,600,000 for the year.

■ ■ ■

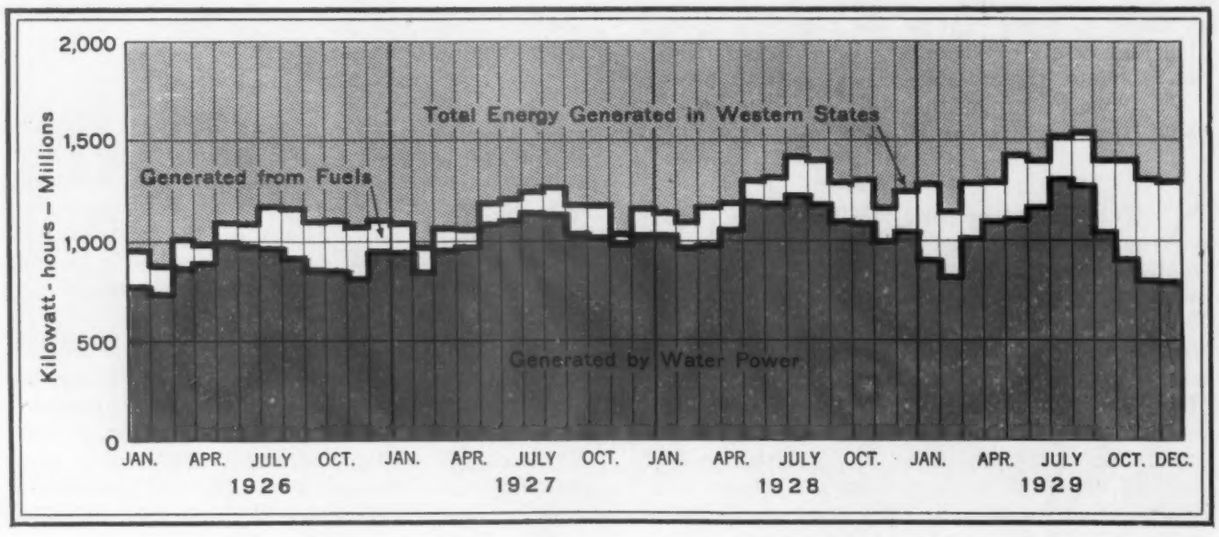
THE HOME was a fertile field for building load during the year. Range sales for companies reporting were approximately 47,000 units, some 4,000 less than the quotas announced a year ago. Water heater sales were better, the 19,500 units reported exceeding last year's quota by 2,000. Other domestic appliances, particularly refrigerators, sold equally well.

■ ■ ■

MERCHANDISE sales by power companies of from $25 to $30 per residence meter for the year were not uncommon. That this sales effort is profitable is shown by increases in average domestic consumption. Individual companies reported increases ranging from 50 to 100 kw.-hr. Many companies closely approximated or exceeded the 1,000 kw.-hr. mark.

■ ■ ■

COMMERCIAL departments have accepted the new selling responsibility that has been placed upon them by chief executives. The industry is fully awake to the sales opportunities ahead. Many were the fields that received intensive cultivation in 1929. Industrial heating, rural electrification and the oil fields received attention from the power salesman. The results accomplished indicate great possibilities for the future.



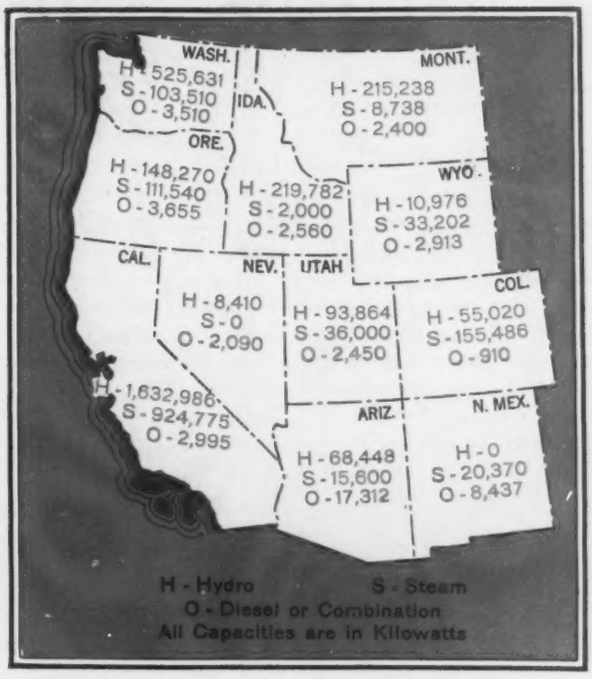
Dry Year Calls for More Steam Generated Energy

1930 (Contd.)

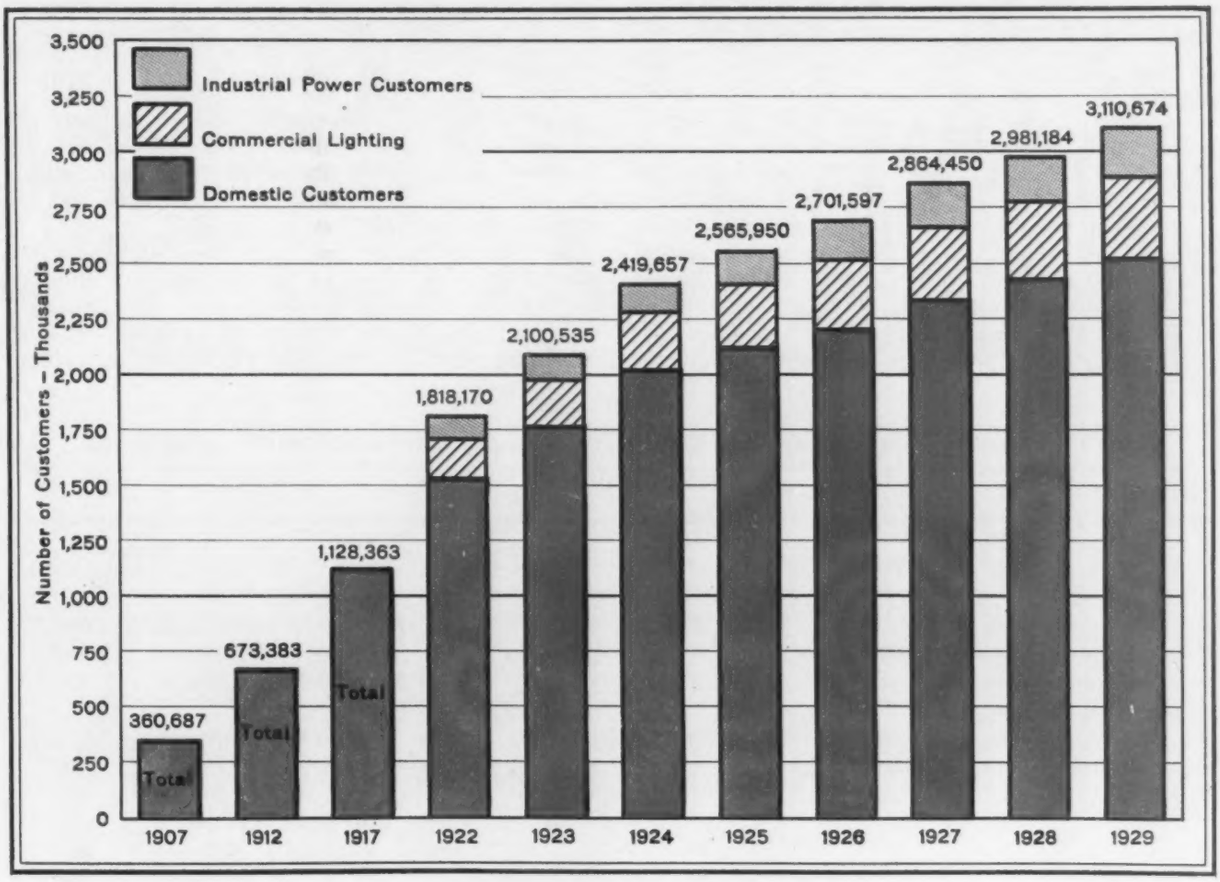
LIKE congested streets and highways that were never designed for today's traffic, wiring in old buildings is holding back greater utilization of electrical service. The year should see this problem attacked with even greater vigor than in the past. Red Seal takes care of new structures—now for some equally effective promotional campaign for old ones.

■ ■ ■

SELL, sell, sell! The commercial man has come into his own. More kilowatt-hours per dollar of invested capital. Better merchandising methods, more modern selling, more effective advertising and larger advertising appropriations, these will be among the developments in 1930. Dealer co-operation is receiving and will receive more attention. The industry has realized that the wires and appliances which translate electricity into a useful service must be sold; that it is dealing with a public that is beset on every side with appeals to part with its money for everything from automobiles to European tours. In 1930 the industry's selling methods will be geared accordingly.



Installed Capacity Increases



Customers Increase 4.2 Per Cent

Progress Satisfactory—
The Future Is Bright

MAINTAINING the same normal rate of growth that has held for the past four years, the electric light and power companies of the eleven Western states continue to set a pace that makes this region the most highly electrified in the nation. During the year just closed energy generation increased 8 per cent and gross revenues 7.2 per cent. The increase in generation is identical with the 1928 figure but revenue shows an upward trend from the 6.7 per cent reported for 1928 over 1927. Total customers exceed three millions, having reached 3,120,674 on Jan. 1, 1930. The increase for the year was 4.6 per cent. Total electric energy sales were 13,820,000,000 kw.-hr. for the year compared with 12,110,000,000 kw.-hr. for 1928. Estimated gross revnue for 1929 was $266,600,000 as against $248,500,000 for 1928.

WESTERN electrical leadership continues as generation increases 8 per cent, revenues 7.2 per cent, customers 4.6 per cent. Power production is 17.8 per cent of country's total. Steam plants perform yeoman service during 1929

Energy production of all public utility plants (U.S.G.S. data) for 1929 was 16,480,084,000 kw.-hr., representing 17.8 per cent of the total for the country. Hydro plants, because of the extreme drought of the summer and fall, contributed only 75.7 per cent of the total or 12,464,514,000 kw.-hr. In 1928 hydro power accounted for 86.2 per cent of the total or 13,186,611,000 kw.-hr. The drop in hydro production in 1929 as against 1928 was 5.5 per cent. Steam plants, installed largely during the last five years, came to the rescue, except in the case of the Tacoma municipal system where the *U.S.S. Lexington* was pressed into service to make up the deficiency. Steam plants accounted for 4,025,570,000 kw.-hr., an increase of 92.1 per cent over the 2,096,959,000 kw.-hr. produced in 1928.

The drought and the resultant increased demand upon steam plants for the power necessary for adequate service caused an increase in the quantity of coal used and a doubling of the amount of fuel oil and natural gas burned in steam plants. Coal consumption increased from 510,900 tons in 1928 to 690,450 tons in 1929, or 35 per cent. This territory, however, is largely dependent upon oil and natural gas for fuel and it was here that the marked increase occurred. In 1929 fuel oil consumption reached 3,451,719 bbl., an increase of 95.4 per cent over the 1,777,642 bbl. consumed in 1928. Natural gas consumption was 26,103,347,000 cu.ft. in 1929 as against 13,680,872,000 cu.ft. in 1928, or an increase of 91.6 per cent.

Despite the drought the West leads the nation in the production of hydro-electric energy. In 1929 the eleven Western states supplied 37.1 per cent of the total produced in the United States, which is approximately the same proportion supplied in 1928, showing that the effects of the dry year were nationwide.

Rate reductions in practically every section of the country on many classes of business had little effect on the over-all increase in gross revenue. This increased from $248,500,000 in 1928 to $266,600,000 in 1929. Operating expenses rose from $91,200,000 in 1928 to

Table I—Central Station Operation in 11 Western States in Comparison with United States, 1928 and 1929

Item	11 Western States		United States		Per cent 11 Western States to U. S.
	1928	1929*	1928	1929*	1929
Energy generated (thousands of kw.-hr.)	15,283,570	16,480,084	82,916,746	92,737,000	17.8
Energy generated by hydro plants (thousands of kw.-hr.)	13,186,611	12,464,514	33,508,124	33,673,000	37.1
Energy generated by steam plants (thousands of kw.-hr.)	2,096,959	4,025,570	49,418,622	59,064,000	6.8
Percentage of total energy produced by hydro	86.2	75.7	40.4	36.4	....
Coal consumption by central stations (short tons)	510,900	690,450	37,593,470	41,794,600	1.6
Fuel oil consumption by central stations (bbl.)	1,770,642	3,451,719	6,852,176	9,477,526	36.4
Gas consumption by central stations (thousands of cu. ft.)	13,680,872	26,103,347	77,054,921	112,672,400	23.1
Gross revenue from sale of energy	$248,500,000	$266,600,000	$1,941,900,000	$2,107,000,000	12.7
Operating and maintenance expenses†	91,200,000	97,000,000	866,300,000	942,000,000	10.3

*Based on ten months' operations.
†Do not include interest, taxes, depreciation or sinking fund charges.

Table II—Energy Generated in Public Utility Plants of 11 Western States, 1921-1929*

State	ENERGY GENERATED (THOUSANDS OF KW.-HR.)								
	1921	1922	1923	1924	1925	1926	1927	1928	1929†
California	3,982,938	4,379,703	5,069,314	5,566,440	6,215,813	6,898,620	7,355,548	7,979,827	8,777,221
Oregon	468,534	512,804	594,434	678,394	729,859	831,135	844,654	1,040,743	1,157,376
Washington	1,176,662	1,285,625	1,446,486	1,503,560	1,623,007	1,807,792	2,121,939	2,361,024	2,535,731
Nevada	36,532	39,282	47,048	41,623	39,703	36,840	51,236	54,935	43,905
Utah	119,551	145,689	272,577	266,946	339,967	349,604	338,067	282,791	395,523
Arizona	132,434	144,615	157,183	153,196	130,531	172,243	278,559	335,755	284,592
New Mexico	15,768	17,140	18,268	19,913	21,787	25,993	33,462	52,326	66,378
Colorado	362,651	413,475	461,570	490,030	522,892	561,962	551,173	541,150	560,898
Wyoming	37,855	38,985	48,853	53,556	55,544	59,381	66,493	83,931	96,647
Idaho	550,149	615,783	694,781	792,532	754,079	810,789	806,402	947,709	900,707
Montana	596,610	984,972	1,138,545	1,145,285	1,262,629	1,407,903	1,394,655	1,619,351	1,619,996

*U. S. G. S. Data.
†December estimated.

$97,000,000 in 1929. These figures do not include interest, taxes, depreciation or sinking fund requirements. Operating ratio was practically unchanged.

In energy generation California leads all other states, producing approximately half of the total for the territory. Its plants produced 8,777,221,000 kw.-hr. in 1929, an increase of 10 per cent over 1928. Washington was second with 2,535,731,000 kw.-hr. and Montana third with 1,619,996,000 kw.-hr. Production in Idaho fell off on account of the shortage of water. Since much of Idaho's power is consumed in Utah, this difference was made up in the production from the latter state's steam plants. California still ranks high among the electrical consuming states of the country. In 1929 it was only exceeded by New York in the amount of energy produced. It took this place from Pennsylvania in 1928 and during the year just closed it increased its lead by 639,000,000 kw.-hr.

With 3,120,674 electrical consumers of all classes at the close of 1929, the West had 12.7 per cent of the total for the United States with only 9 per cent of the population, indicating that this section still has a higher average percentage of wired homes than the country as a whole. The increase in customers for the year was 139,490. The classification of customers includes 2,535,021 residential, 360,083 commercial and 225,570 industrial. Twenty-one per cent of the country's industrial customers are in this section, indicating a much higher relative degree of industrial electrification than for other regions of the nation. California with 1,778,840 customers has 56 per cent of the customers in the West. It is exceeded in total number, however, by New York, Pennsylvania and Illinois in the order named.

In so far as the Western states are concerned, the percentage increase in total number of customers becomes smaller each year. Owing to the high percentage of wired homes in this territory, the power companies must look largely to population increase for new customers. Practically every home within reach of central station lines is now a customer. Some extensions are yet to be made into rural territories but the number of new customers to be expected from this source is relatively small. Increased sales therefore must come from effort expended upon present customers to increase their use by the installation of more appliances.

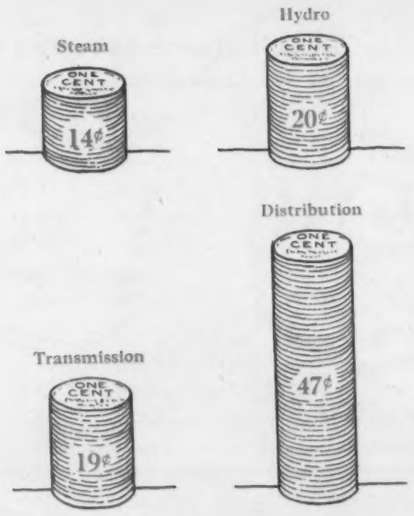
In generation per capita or per customer the West continues to lead, with Montana first and California second for all states in the Union. Generation per customer for the eleven Western states in 1929 was 5,280 kw.-hr.; for the entire United States, 3,825 kw.-hr.

Table III—Classification of Central Station Customers Showing Growth During 1929

State	Total Central Station Customers			Domestic Lighting Customers			Commercial Lighting Customers			Industrial Power Customers		
	Jan. 1 1929	Jan. 1 1930	Growth 1929	Jan. 1 1929	Jan. 1 1930	Growth 1929	Jan. 1 1929	Jan. 1 1930	Growth 1929	Jan. 1 1929	Jan. 1 1930	Growth 1929
California	1,697,600	1,778,840	81,240	1,353,270	1,408,350	55,080	185,160	194,290	9,130	159,170	176,200	17,030
Oregon	216,680	226,500	9,820	187,420	196,270	8,850	19,670	20,250	580	9,590	9,980	390
Washington	440,897	465,067	24,170	380,000	400,080	20,080	49,030	52,500	3,470	11,867	12,487	620
Nevada	17,000	18,110	1,110	13,066	13,916	850	3,459	3,689	230	475	505	30
Utah	125,568	129,998	4,430	105,882	109,472	3,590	15,087	15,837	750	4,599	4,689	90
Arizona	59,301	64,591	5,290	48,552	52,872	4,320	7,783	8,483	700	2,966	3,236	270
New Mexico	28,854	30,674	1,820	24,035	25,115	1,080	3,662	4,092	430	1,157	1,467	310
Colorado	198,004	200,354	2,350	161,996	163,436	1,440	28,315	28,805	490	7,693	8,113	420
Wyoming	31,685	32,795	1,110	27,134	28,084	950	3,213	3,323	110	1,338	1,388	50
Idaho	79,783	83,743	3,960	63,014	66,124	3,110	14,226	14,926	700	2,543	2,693	150
Montana	85,812	90,002	4,190	67,922	71,302	3,380	13,428	13,888	460	4,462	4,812	350
11 Western States	2,981,184	3,120,674	139,490	2,432,291	2,535,021	102,730	343,033	360,083	17,050	205,860	225,570	19,710
Total United States	23,184,781	24,257,159	1,072,378	18,833,970	19,721,486	887,516	3,329,939	3,456,434	126,495	1,020,872	1,079,239	58,367

Budget for 1930 Is *$137,821,000*

POWER companies will spend six per cent more than in 1929. Transmission and distribution facilities represent 66 per cent of total expenditures



Segregation of the 1929 budget dollar of the Western central stations

SHOWING a six per cent increase over 1929 expenditures, the 1930 budgets for new construction and extensions to the systems of the electric light and power companies of the West total $137,821,000. Expenditures in 1929 were $130,348,000 and in 1928 power companies spent only $107,319,000. Thus the 1930 budgets represent an increase of 28 per cent over 1928. Only twice, in 1925 and in 1926, have expenditures exceeded the amounts scheduled to be spent during the current year.

Additional distribution facilities will require almost half of the expenditures during 1930, a total of $60,499,000 having been set aside for this classification. This is the largest amount in the history of the industry in this territory, exceeding even the record figures of 1929. The 1930 budget assigns $25,788,000 for new hydro-electric facilities, including both new plants and additions to existing stations, $17,000,000 to new steam generating stations and $24,184,000 for new transmission systems. A new classification has been added to the figures compiled this year. Miscellaneous construction such as offices, shops, warehouses, garages and structures not strictly belonging to any of the previous classifications will require $10,350,000.

In all of the five different classifications shown in Table I, except transmission, budgets for 1930 exceed the actual expenditures of 1929. The largest increase is for distribution facilities with approximately four and a half millions more to be spent this year.

A decreasingly small proportion of the budget is being spent on generating facilities. From 1922 to 1926 the average proportion spent for new plants was 44 per cent. Since 1927 the average has been only 33 per cent. The difference has gone largely into distribution facilities.

Table I—Valuation of Additions and Extensions to Western Power Systems, 1924-1930

	1924	1925	1926	1927	1928	1929	1930*
Hydro-electric Generating Stations	$ 37,980,000	$ 55,000,000	$ 45,000,000	$ 21,497,000	$ 22,588,100	$ 23,482,000	$ 25,788,000
Steam-electric Generating Stations	13,100,000	25,000,000	25,000,000	13,711,000	16,905,700	15,758,000	17,000,000
Transmission Systems	19,790,000	45,300,000	60,000,000	22,121,000	18,575,100	27,902,000	24,184,000
Distribution Systems	38,310,000	15,000,000	40,132,000	49,878,000	45,966,100	56,029,000	60,499,000
Miscellaneous Expenditures†	.....	.....	.....	.....	3,284,000	7,177,000	10,350,000
Total	$109,180,000	$140,300,000	$170,132,000	$107,207,000	$107,319,000	$130,348,000	$137,821,000

*Budget estimates.
†Not included prior to 1928.

Table II—Segregation of Expenditures for Transmission and Generation, 1922-1930

Year	Total Construction Budgets for Year	Total Expenditures for Generating Plants	Total Expenditures for Transmission and Distribution	Per Cent of Total for Generating Plants	Per Cent of Total for Transmission and Distribution
1922	$ 75,986,000	$31,533,000	$ 44,453,000	41.5	58.5
1923	102,662,000	33,092,000	59,570,000	32.2	67.8
1924	109,180,000	51,080,000	58,100,000	46.8	53.2
1925	140,300,000	80,000,000	60,300,000	57.0	43.0
1926	170,132,000	70,000,000	100,132,000	40.9	59.1
1927	107,207,000	35,208,000	71,999,000	32.8	67.2
1928	104,035,000	39,493,800	64,541,200	38.9	61.1
1929	123,171,000	39,240,000	83,931,000	31.8	68.2
1930*	127,470,000	42,788,000	84,683,000	33.6	66.4

*Budget estimates.

Assuring Adequate Kilowatt-hours for the West

RECORD DAM

City of Seattle's 388-ft. arch dam on Skagit River (Wash.) will create 330-ft. head and 80,000 acre-ft. storage for the new 120,000-kw. Diablo power house

TREND IN HYDRO

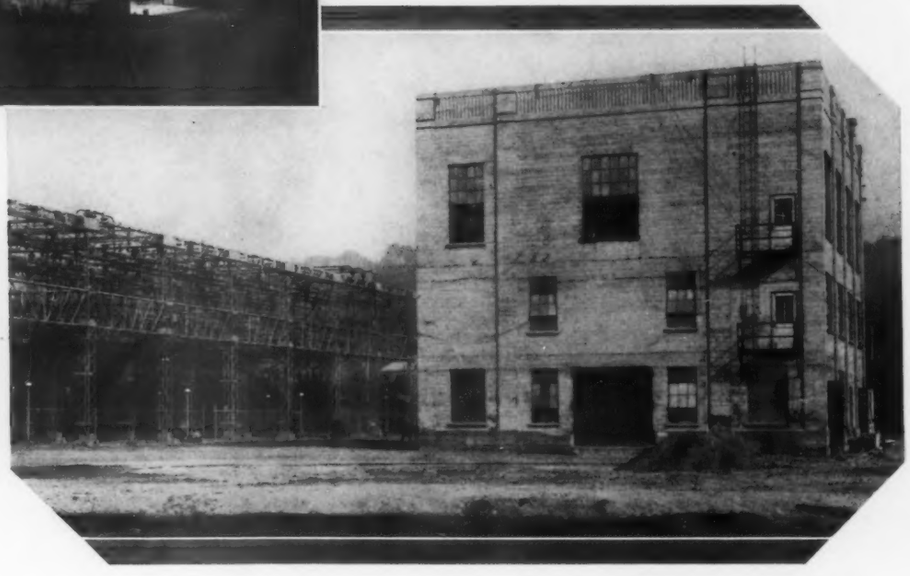
Fully automatic 2,250-kw. Kaweah No. 1 plant of Southern California Edison Company replaces plant built in 1898

RECORD ROCK-FILL

Pacific Gas and Electric Company's three million cubic foot rock-fill dam on the Mokelumne River (Calif.) forms foundation of 100,000-kva. development

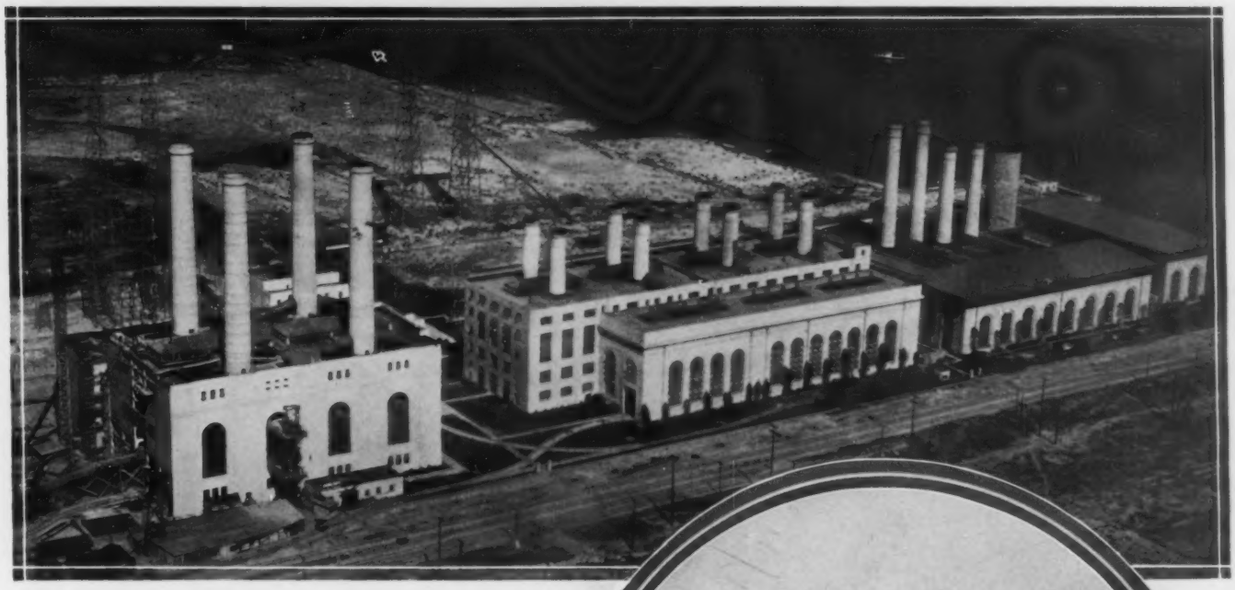
PLANT ILLUMINATION

Los Angeles Bureau of Power & Light is proud of the interior lighting of its rebuilt San Francisquito No. 2 power house



SEATTLE CENTER

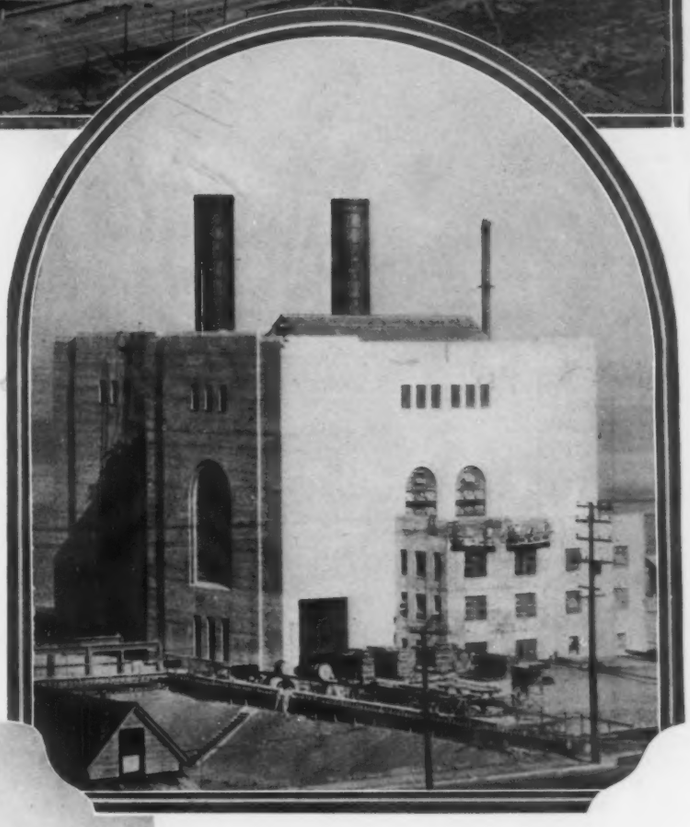
Renton (Wash.) high-tension switching center recently completed by Stone & Webster for Puget Sound Power & Light Company

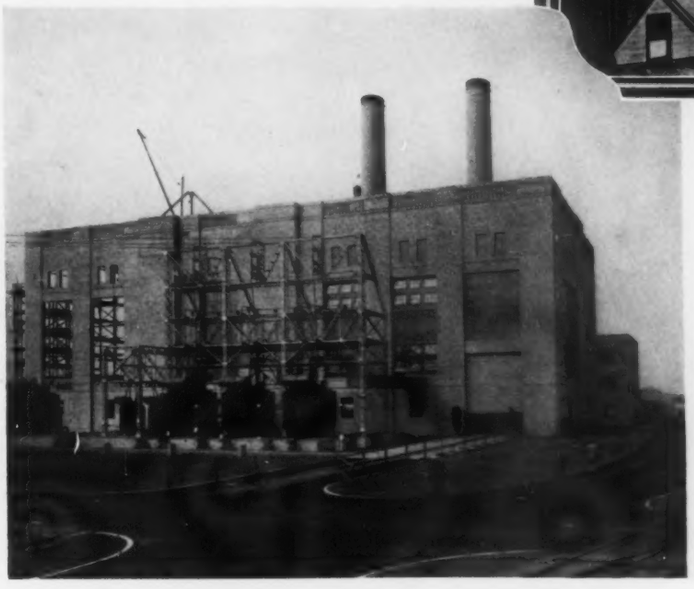


STEAM!

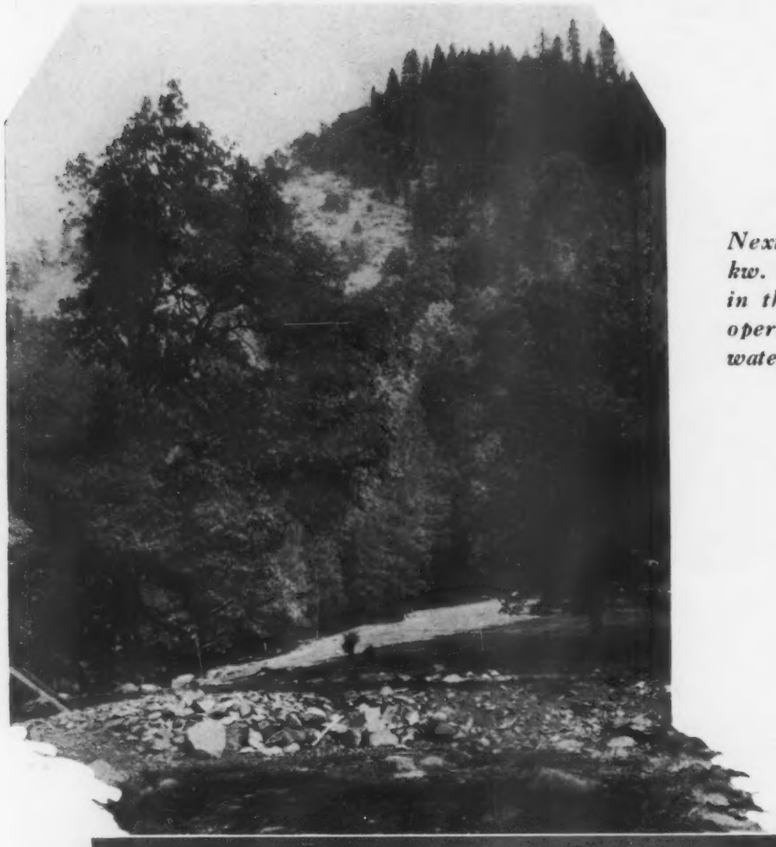
Second 100,000-kw. unit nearing completion on schedule at Southern California Edison Company's Long Beach No. 3 plant. (Above)

First 35,000-kw. unit completed in Great Western Power Company's San Francisco steam plant. (Right)





Shuffleton steam plant (Seattle) built by Stone & Webster Engineering Corporation for Puget Sound Power & Light Company now has one 35,000-kw. unit in operation and the second under construction. (Left)

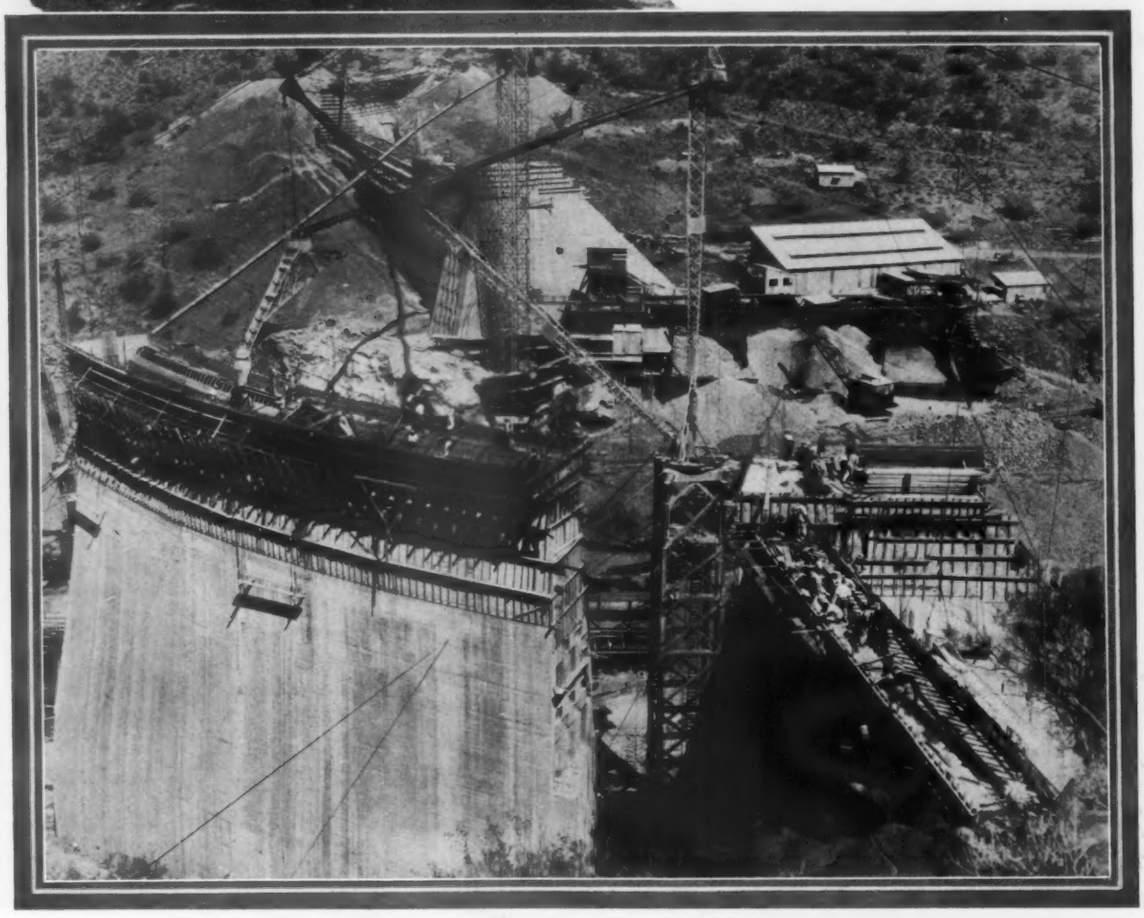


TIGER CREEK

Next year there will be a 50,000-kw. Pacific Gas and Electric plant in the meadow shown at the left operating on Mokelumne River water made available by the Salt Springs Dam

ARIZONA

Stewart Mountain Dam of the Salt River Valley Water Users' Association as it appeared Sept. 5, 1929 (below). This 180-ft. structure will provide more water for power and irrigation purposes. The project is now practically completed



New Capacity—

202,000 Kva.

in 1929

471,490 Kva.

in 1930

Western power companies develop 98,250 kva. in hydro plants during past year. Current year's program calls for 218,190 kva. in water power plants

REACTING from the high-water mark of 1928 when 530,285 kva. in new capacity was installed, electric light and power companies of the eleven Western states added but 202,000 kva. in generating capacity to their systems in 1929. This is the smallest addition in six years. It will be more than offset in 1930, however, when another record-breaking total of 471,490 kva. will come on the lines. Of the new capacity added in 1929 98,250 kva. was in hydro-electric plants and 103,750 kva. in steam stations. Only once previously, in 1926, has the amount of steam capacity added exceeded hydro. The same condition will hold again in 1930 when hydro plants will contribute 218,190 kva. and steam stations 253,750 kva.

Gorge power house (City of Seattle) on the Skagit River. Two 30,000-kva. and one 33,000-kva. units now installed, the latter in 1929. Ultimate capacity expected to be 240,000 kw.

Big Creek No. 8 (Southern California Edison Company) with 55,500 kw. in installed capacity

Considering the seven-year period, 1924-30 inclusive, Western central stations will have added 2,499,561 kva. in new capacity, an increase of approximately 100 per cent in that period. The average annual increase during that time has been 357,090 kva. with hydro supplying 62 per cent of the total.

No important new hydro stations were completed in 1929. Most of the capacity is accounted for in the third 33,000-kva. unit installed in the Gorge plant of the City of Seattle Lighting Department and a second unit of 35,000-kva. capacity added to the Big Creek No. 8 plant of the Southern California Edison Company. The Eugene (Ore.) Utility Department completed its 7,500-kva. Leaburg plant and the Pacific Gas and Electric Company its fully-automatic, 7,000-kva. Spaulding No. 3 plant. Two by-product plants, Pardee of the East Bay Municipal Utility District and Coolidge Dam of the U. S. Indian Field Service, account for 20,500 kva. Water for municipal supply in the first case and for irrigation in the second was the primary reason for both of these developments.

The year 1930 presents a different story with several important hydro plants to be completed during the coming eleven months. Foremost is the 60,000-kva. Cushman No. 2 plant of the City of Tacoma Light Division. A total of 50,000 kva. will be added to the power resources of the Montana Power Company through the completion of the Morony development on the Missouri

Some Additions to Hydro-electric Generating

No.	COMPANY	PLANT	LOCATION	DAMS			CANALS AND TUNNELS			PENSTOCKS			HEAD (Ft.)	
				Type	Reservoir Capacity (Acre-ft.)	Height (Ft.)	Type	Dia. (Ft.)	Length (Ft.)	Dia.	Length (Ft.)	Type	Static	Effective
(1)	Bridge River Power Company (Sub. B. C. Electric Ry. Company, Ltd.)	Bridge River	Seton Lake, B. C.	.....	.....	.....	Tunnel	14'3" Equiv.	13,200	.....	2,100	.....	1,200	1,150
(2)	Western Power Company of Canada (Sub. B. C. Electric Railway Company, Ltd.)	Ruskin	Stave River, B. C.	Concrete Gravity	.....	184	4 Penstock Tunnels 400 ft. long			21' 19'	400	Concr. Rivtd.	.....	123 Av.
(3)	Vancouver Island Power Company (Sub. B. C. Electric Railway Company, Ltd.)	Jordan River 4th Unit	Jordan River, B. C.	Earth Fill	.....	5 Addtl.	Wood Flume	.....	.....	60" 48"	9,250	Rivtd.	1,145	1,020
(4)	City of Seattle Lighting Department	Gorge 3rd Unit	Skagit River, Wash.	†	†	†	†	†	†	†	†	†	278	265
(5)	City of Seattle Lighting Department	Reflector Bar	Skagit River, Wash.	Concrete Arch	87,500	385	Tunnel	.....	2,000	.....	.....	.....	325	320
(6)	City of Tacoma Department of Public Utilities	Cushman No. 2	Hood Canal at Potlatch, Wash.	Constant Radius	8,000	240	Tunnel	17	13,000	10'6" 9'	1,400	Rivtd.	480	450
(7)	Inland Power & Light Company	Ariel	Lewis River, Wash.	Constant Angle	220,000	185	None	.....	.....	Not designed		.....	260	185
(8)	Inland Power & Light Company	Joseph	Wallowa River, Ore.	†	†	†	Wood Pipe	4'	6,600	.....	.....	.....	.....	153
(9)	City of Eugene Utility Department	Leaburg	Leaburg, Ore.	.....	.....	20	Canal	.....	26,400	12'	300	Concr.	89	88
(10)	Portland Electric Power Company	Station "P"	Three Links, Ore.	†	†	†	†	†	†	.....	1,360	.....	922	860
(11)	Great Falls Power Company (Sub. Montana Power Company)	Morony	Missouri River, Mont.	Gravity	2,000	90	.....	.....	.....	21'	32	.....	83	82
(12)	U. S. Bureau of Reclamation	Shoshone 3rd Unit	Near Cody, Wyo.	†	†	†	†	†	†	96"	100	Rivtd.	220	.....
(13)	Public Service Company of Colorado	Salida No. 1 2nd Unit	Near Salida, Colo.	†	†	†	Steel Pipe	24"	4,898	30" 26"	8,083	Rivtd.	439	.....
(14)	Dixie Power Company	No. 4	Virgin River, Utah	Diversion	.....	4	Tunnel Canal	5x6'	873 7,453	42"	3,003 486	Wood Weld.	238	230
(15)	Salt River Valley Water Users' Association	Stewart Mountain	Salt River, Ariz.	Single Arch	70,000	207	None	.....	.....	13½'	60	Rivtd.	114	Var.
(16)	Pacific Gas and Electric Company	Spaulding No. 3	Nevada County, Calif.	None	.....	.....	None	.....	.....	66" 60"	1,615	Rivtd.	320	306
(17)	Pacific Gas and Electric Company	Salt Springs	Amador County, Calif.	Rock Fill	130,000	328	Tunnel	19'	1,000	10' 8½'	450	Rivtd.	244	Var.
(18)	Pacific Gas and Electric Company	Tiger Creek	Amador County, Calif.	None	.....	.....	Concrete Flume Tunnel	14x7' 8'	 12,300	108" 40"	4,600	Rivtd.	1,219	1,190
(19)	San Joaquin Light & Power Corporation	Merced Falls	Merced River, Calif.	Gravity	620	34	None	.....	.....	.....	.....	.....	26	26
(20)	Southern California Edison Company	Big Creek 3 2nd Unit	Big Creek, Calif.	†	†	†	†	†	†	120" 84"	2,700	Rivtd.	715	690
(21)	East Bay Municipal Utility District	Pardee	Mokelumne River, Calif.	Arch Gravity	222,000	227	None	.....	.....	72"	244	Cast Iron	325-275	300 Av.
(22)	U. S. Indian Field Service	Coolidge Dam	Gila River, Ariz.	Multiple Dome	1,200,000	251	None	.....	.....	.....	.....	.....	220-160	190 Av.

†Existing structures or facilities will be used.
*Abbreviations used are: Dom., Dominion Engineering Works; G. E., General Electric Company; S. M. S., S. Morgan Smith Company; West., Westinghouse Electric & Manufacturing Company; A.-C., Allis-Chalmers Manufacturing Company; Pelton, Pelton Water Wheel Company; I. P. M., I. P. Morris Division William Camp & Sons Ship & Engine Building Corporation.

River near Great Falls, Mont. The British Columbia Electric Railway Company, Ltd., will bring in the initial two units with the 44,000-kva. capacity of its 188,000-hp. Ruskin development. This same company will add to its capacity on Vancouver Island with a 12,000-kva. unit in its Jordan River plant.

Table I--Additions to Generating Capacity in the 11 Western States, 1924-1930

Year	Hydro-electric Capacity (kva.)	Steam Capacity (kva.)	Total (kva.)
1924	243,223	147,500	390,725
1925	321,125	95,000	416,125
1926	111,500	116,805	228,305
1927	236,433	23,750	260,183
1928	292,250	238,035	530,285
1929	98,250	103,750	202,000
1930	218,190	253,750	471,490
Total for seven-year period	1,520,971	978,590	2,499,561
Average for seven-year period	217,281	139,799	357,090

The Portland Electric Power Company will add a second 30,000-kva. unit to its Oak Grove plant where the reaction turbine will operate under the record head of 860 ft. (effective). Only 12,000 kw. in peaking capacity will be available from this unit for the present, pending extensive development of the hydraulic works of the company on the Clackamas River. The Salt River Valley Water Users' Association will complete its 13,000-kva. Stewart Mountain plant, the fourth on the Salt River in Arizona.

Construction work will be under way on several developments during the year. Foremost is the Salt Springs and Tiger Creek project of the Pacific Gas and Electric Company where 71,000 kva. are being developed. The Inland Power & Light Company will be actively engaged in the development of the Ariel site on the Lewis River in Washington where 40,000 kw. of a possible 160,000 kw. will be installed initially. Con-

Plants in the Eleven Western States, 1929-1930

PRIME MOVERS			GENERATING UNITS			PLANT CAPACITY (kw.)		TRANSFORMERS	TRANSMISSION LINES			PRESENT STAGE OF DEVELOPMENT	ESTIMATED COST	No.
No.	Capacity (hp.)	Maker	No.	Capacity (kva.)	Maker	Present or Proposed	Ultimate		Length (Miles)	Voltage (kv.)	Type			
2	40,000	.....	2	30,000 (kw.)	.....	60,000	594,000 (hp.)	.....	130	220	.....	Tunnel under construction	$13,948,000	(1)
1	47,000	Dom.*	1	44,000	.....	47,000 (hp.)	188,000 (hp.)	4-14,667-kva. G. E.* 13,200/68,600 volt.	28	66	Wood Pole	To be completed Fall, 1930	7,226,000	(2)
1	18,000	.....	1	12,000 (kw.)	.....	43,000 (hp.)	43,000 (hp.)	3-5,000-kva.	†	†	†	To be completed Fall, 1930	750,000	(3)
1	37,500	S.M.S.	1	33,000	West.	60,000	240,000	3-10,000-kva. West. 11,000/165,000 volt	†	†	†	Completed May, 1929	540,000	(4)
2	80,000	.....	2	60,000	.....	120,000	180,000	.....	120	165	.....	Under construction	8,000,000	(5)
2	37,500	A.-C.	2	30,000	A.-C.	54,000	81,000	3-60,000-kva. A.-C.	†	†	†	To be completed 1930	5,000,000	(6)
	Being Designed			Being Designed		40,000	160,000	Not designed	28	110	Wood Pole	Under construction	9,000,000	(7)
1	1,450	Pelton	1	1,250	West.	1,250	1,250	3-400-kva. G. E.	None	.....	.....	Completed November, 1929	150,000	(8)
1	9,000	S.M.S.	1	7,500	West.	6,750	13,000	3-2,500-kva. West. 11,000/66,000 volt.	21	44	Wood Pole	Completed December, 1929	1,800,000	(9)
1	35,000	.....	1	.....	.....	51,000	76,500	2-10,000-kva.	†	†	†	To be completed 1930	850,000	(10)
2	31,000	I.P.M.	2	25,000	West.	45,000	45,000	4-16,666-kva. G. E. 13,200/110,000 volt.	14	110	Wood Pole	To be completed January, 1930	4,000,000	(11)
1	5,600	.....	1	5,000	.....	5,600	5,600	3-1,667-kva. 2,300/33,000 volt.	.....	.....	.....	To be completed 1930	175,000	(12)
1	1,100	S.M.S.	1	750	G. E.	1,150	1,150	†	†	†	†	To be completed 1930	100,000	(13)
1	1,100	Pelton	1	1,000	West.	800	800	4-333-kva. G. E. 2,300/33,000 volt.	†	†	†	Completed March, 1929	100,000	(14)
1	17,500	S.M.S.	1	13,000	G. E.	10,000	10,000	3-5,000-kva. G. E. 11,000/45,000 volt.	13	45	.....	To be completed March, 1930	2,300,000	(15)
1	8,000	Pelton	1	7,000	West.	6,000	6,000	4-2,500-kva. West. 6,600/60,000 volt.	2	60	Wood Pole	Completed February, 1929	535,000	(16)
1	13,500	Pelton	1	11,000	West.	10,000	30,000	4-12,000-kva. A.-C. 11,000/110,000 volt.	18	110	Steel Tower	Under construction	9,280,000	(17)
2	36,000	Pelton	2	30,000	West.	50,000	50,000	7 G. E. 11,000/110,000/220,000 volt.	106.5	220	Steel Tower	Under construction	12,630,000	(18)
1	4,750	S.M.S.	1	3,440	West.	3,440	3,440	†	†	†	†	To be completed June, 1930	500,000	(19)
1	44,000	Pelton	1	35,000	G. E.	55,500	55,500	4-20,000-kva. G. E. 11,000/220,000 volt.	†	†	†	Completed June, 1929	.....	(20)
2	10,000	Pelton	2	7,500	G. E.	15,000	15,000	6-2,500-kva.	.....	.....	.....	Completed 1929	6,000,000	(21)
2	7,500	Pelton	2	6,250	West.	12,000	12,000	7-2,000-kva. West. 6,600/44,000 volt.	20	44	Steel Tower	Completed 1929	.....	(22)

struction work will continue on the Reflector Bar project of the City of Seattle Lighting Department where the dam is nearing completion and also upon the Bridge River project of the B.C. Electric company where excellent progress is being made in the 13,200-ft. tunnel.

One of the interesting trends to be expected in the near future is further conversion of small hydro plants into automatic stations. Marked economies both from the standpoint of increased efficiency and operating labor can be realized where conditions permit such conversion.

Table II--Additions to Generating Capacity in the Eleven Western States by Districts 1924-1930

YEAR	CALIFORNIA			PACIFIC NORTHWEST*			INTERMOUNTAIN†		
	Hydro-electric (kva.)	Steam (kva.)	Total (kva.)	Hydro-electric (kva.)	Steam (kva.)	Total (kva.)	Hydro-electric (kva.)	Steam (kva.)	Total (kva.)
1924	68,483	97,000	165,483	135,850	23,000	158,850	38,900	27,500	66,400
1925	243,700	65,000	308,700	62,125	10,000	72,125	15,300	20,000	35,300
1926	33,250	60,555	93,805	60,000	25,000	85,000	18,250	31,250	49,500
1927	67,000	23,750	90,750	77,833	.....	77,833	92,600	3,000	95,600
1928	208,750	227,035	435,785	83,500	6,000	89,500	.....	5,000	5,000
1929	49,500	35,000	84,500	41,750	68,750	110,500	14,000	.....	14,000
1930	3,440	150,000	153,440	146,000	88,750	234,750	68,750	15,000	83,750

*Includes Oregon, Washington and western British Columbia.
†Includes Idaho, Montana, Wyoming, Colorado, Utah, New Mexico and eastern Arizona.

Some Additions to Steam Electric Generating

	COMPANY	PLANT	LOCATION	BOILERS No.	BOILERS Type	BOILERS Capacity (Boiler hp.)	BOILERS Maker	FUEL	PRIME MOVERS No.	PRIME MOVERS Capacity (Kw.)	PRIME MOVERS Maker
(1)	Puget Sound Power & Light Company	Shuffleton	Lake Washington, Wash.	2	Stirling	2,487	B. & W.*	Oil and Hogged Fuel	1	35,000	G. E.*
(2)	Puget Sound Power & Light Company	Shuffleton 2nd Unit	Lake Washington, Wash.	1	Stirling	2,475	P. S. M.	Oil and Hogged Fuel	1	35,000	G. E.
(3)	Northwestern Electric Company.....	Lincoln, 3rd Unit	Portland, Ore.	1	Stirling	2,500	B. & W.	Hogged Fuel and Oil	1	27,800 hp.	G. E.
(4)	Portland Electric Power Company...	Station "L"	Portland, Ore.	1	.....	2,000	.....	Hogged Fuel and Oil	1	35,000	G. E.
** (5)	Mountain States Power Company..	Marshfield	Marshfield, Ore.	2	Stirling	1,000	.....	Hogged Fuel	1	12,000	West.
(6)	Central Arizona Light & Power Company.....	Central Arizona	Phoenix, Ariz.	2	Stirling	1,217	B. & W.	Oil and Coal	1	18,000	G. E.
(7)	Pacific Gas and Electric Company...	Station "A"	San Francisco	3	Cross Drum	500,000 lb. steam per hr. per boiler	B. & W.	Gas and Oil	2	50,000 (Compound)	G. E.
(8)	Great Western Power Company.....	San Francisco	San Francisco	2	Horizontal Tube	2,225	W. & W.	Oil	1	35,000	G. E.
(9)	Southern California Edison Company.	Long Beach No. 3 2nd Unit	Long Beach, Calif.	3	Cross Drum Straight Tube	.....	B. & W.	Oil and Gas	1	94,000	G. E.
(10)	San Joaquin Light & Power Corporation.....	.....	Not determined	...	Not determined	.....	.....	Oil and Gas	1	35,000	.....

†Existing structures or facilities will be used.

*Abbreviations used are, B. & W., Babcock & Wilcox Company; G. E., General Electric Company; West., Westinghouse Electric & Manufacturing Company; P. S. M., Puget Sound Machinery Depot; W. & W., Hedges-Walsh-Weidner Company.

**Item corrected in tabulation after main totals already had been computed. Data received too late for original tabulation.

Steam Will Lead in 1930

More Than Half of Total New Electric Generating Plant Capacity on Pacific Coast Will Be in Fuel-Burning Plants

TWO features stand out prominently in connection with two of the three major steam-electric developments now well under way on the Pacific Coast. One of these is the addition of the second 100,000-kva. single-unit steam electric generator at the Long Beach No. 3 plant of the Southern California Edison Company, bringing the capacity of that plant up to 200,000 kva. and the capacity of the Long Beach group of plants up to more than 400,000 kva.

The second noteworthy factor is the high-pressure plant that the Pacific Gas and Electric Company is making out of its station "A" in San Francisco where the two new 50,000-kw. units are to operate on 1,200-lb. steam. Thus the rebuilt plant will be the highest pressure plant on the Pacific Coast, and one of the highest pressure commercial steam-electric generating plants in the entire country. At the Long Beach steam plant of the Southern California Edison Company the steam pressure at the throttle is 400 lb., while at the new Shuffleton steam-electric plant of the Puget Sound Power & Light Company at Seattle the pressure will be 450 lb. per sq. in. Boilers at station "A" in San Francisco will evaporate 500,000 lb. of water per hour.

These upward trends in unit sizes and boiler pressures, together with the development of vast quantities of natural gas which serves most admirably for steam plant fuel, are focusing national attention upon Pacific Coast steam-electric developments.

Three major units were completed and placed in service during 1929. The largest of these was the 43,750-kva. first unit in the Shuffleton steam plant of the Puget Sound Power & Light Company at Seattle. The next largest of these units was the 35,000-kw. first unit in the new San Francisco steam plant of the Great Western Power Company of California. A 35,000-kw. third unit also was placed in operation at the Northwestern Electric Company's Lincoln steam plant in Portland, Ore. The Shuffleton unit was placed in operation in September, 1929, the Lincoln unit in August, 1929, and the Great Western unit in December, 1929. These three units comprise the total of 103,750 kva. in steam-electric generating capacity brought into production on the Pacific Coast during 1929.

This figure for new capacity will be more than doubled in the 1930 steam plant completion which will total 253,750 kva. Since the 100,000-kva. unit of the Southern

Stations in the Eleven Western States, 1929-1930

GENERATORS			PLANT CAPACITY (Kw.)		TRANSFORMERS	TRANSMISSION LINE			PRESENT STATUS	ESTIMATED COST	
No.	Capacity (Kva.)	Maker	Present or Proposed	Ultimate		Length (Mi.)	Voltage (Kv.)	Type			
1	43,750	G. E.*	35,000	300,000	4-16, 667-kva. West.* 13,200/55,000 volt	32	110	Steel Towers	Completed 1929	$5,120,000	(1)
1	43,750	G. E.	70,000	300,000	3-16,667-kva. West.* 13,200/55,000 volt	†	†	†	To be completed June, 1930	.....	(2)
1	25,000 kw.	G. E.	45,000	45,000	3-5,000-kva. G. E. 11,000/66,000 volt	5.7	66	Wood Pole	Completed August, 1929	1,258,000	(3)
1	35,000 kw.	G. E.	77,500	.....	1-10,000-kva.	†	†	†	Under construction	1,250,000	(4)
1	10,000 kw.	West	16,250	.....	1-15,000-kva. 3 phase 12,000/12,000 volt. 4-833-kva. 1 phase 12,000/2300 volt.	.....	.....	.....	Under construction	1,250,000	(5) **
1	18,000	G. E.	15,000	60,000	2-2,000-kva. (Station Use Only)	.....	12	.....	To be completed 1930	2,550,000	(6)
2 2	38,000 12,000	G. E. G. E.	157,000	200,000	.....	.....	.....	.....	First unit to be completed October, 1930; second unit six months later	6,620,000	(7)
1	35,000	G. E.	35,000	170,000	Delivery to system at generator voltage	.....	.....	.....	Completed December, 1929	3,275,000	(8)
1 1	90,000 4,000 aux.	G. E.	200,000	800,000	4-33,333-kva. West. 16,500/220,000 volt.	†	†	†	To be completed March, 1930	7,000,000	(9)
1	43,750	.....	35,000	.....	Not determined	.....	.....	.....	Proposed, 1930	3,700,000	(10)

California Edison Company is scheduled for completion in March and the 43,750 kva. second unit in the Shuffleton plant is scheduled for completion in June, more than half of the year's total will be in operation by mid-year.

Considering the totals reported for the eleven Western states as of Jan. 1, 1930, the net increase in steam-electric generating capacity for the six-year period, 1924-29, inclusive, was some 672,890 kw. This represents a 94 per cent net increase in capacity over the 716,125 kw. in steam-electric capacity in the eleven Western states as of Jan. 1, 1924. With the completion of projects already under way, the close of 1930 will see a steam plant capacity totaling 1,631,015 kw., which will represent an increase for the seven-year period, 1924-30, inclusive, of 128 per cent gross and 125 per cent net, taking into account the relatively few small, obsolete units that have been taken out of service to provide space for larger units in existing plants.

Considering California alone, the steam-electric generating capacity as of Jan. 1, 1924, was 407,000 kw. In the six-year period, 1924-29, inclusive, a total of 460,340 kw. in new plant capacity was brought into production. This represents a six-year gain of 112 per cent as of Jan. 1, 1930, and with 144,000 kw. in new capacity to be brought in during 1930, the seven-year increase in steam-electric capacity for California will amount to more than 145 per cent net. It is of some interest in passing to note that the capacity at the Southern California Edison Company's Long Beach group of steam plants as of March, 1930, when the No. 11, 100,000-kw. unit comes into production, will be equal to the entire steam-electric generating capacity of the State of California as of Jan. 1, 1924.

For the Northwest, the average annual increase in steam-electric generating capacity from 1924 to 1928, inclusive, amounted to slightly more than 10,000 kw. per year. The completion of a total of 70,000 kw. in Northwest steam plants during 1929 brought the 1924-29 six-year average up to a figure slightly above 20,000 kw. annually. With the completion of the projected and partly constructed 80,000-kw. scheduled for completion in 1930, the seven-year average will have been brought up to very nearly 30,000 kw. annually.

Thus it becomes apparent that while attention was diverted to steam-electric development in California in 1924, it was not until 1928 that major steam projects were undertaken in the Northwest. With the present dry year in the Northwest and its relatively disastrous results upon the production of kilowatt-hours from hydro-electric plants, it is reasonable to expect a marked advance in steam-electric construction in the Northwest. This trend is emphasized by the report that the city of Tacoma will enter upon an era of steam-plant construction immediately upon the completion of its present second unit of the Cushman development, instead of continuing further with hydro-electric developments. Tacoma was particularly hard hit by the 1929 drought in the Northwest because the municipally owned system serving the area is essentially a hydro-electric system and has practically no steam-electric capacity to fall back upon. As is rather widely known, it became necessary for the city to make special arrangements to tie up the U.S.S. *Lexington*, the Navy Department's giant 180,000-kw. airplane carrier, to provide a 30-day emergency delivery of 20,000 kw.

In the Intermountain region the development of steam-electric generating capacity as compared to hydro-electric has been in the nature of one to three. The most important steam-electric development in several years in that area is the 18,000-kw. plant that will be built at Phoenix, Ariz., during 1930 by the Central Arizona Light and Power Company. The new plant will serve that company and at the same time provide steam stand-by for the Salt River Valley Water Users' Association through an inter-system agreement.

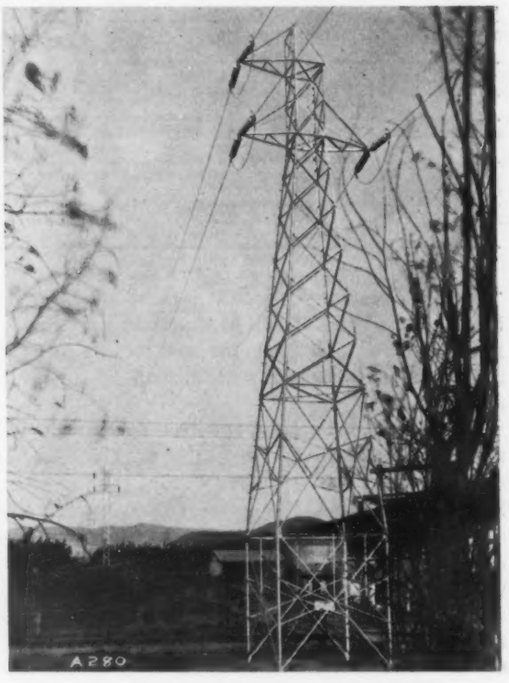
Natural gas also is having its effect upon the enlargement of steam-electric generating facilities. Particularly is this true at the present time in California where the discovery of the now famous Kettleman Hills oil and gas field raised the state's production of natural gas to prodigious amounts, and where the recently enacted conservation laws are stimulating a market development for the gas. In effect, it now is necessary

for the oil companies to conserve the gas flow from existing oil wells before making any further field developments.

The net result of these and other related factors has been to make available gas as steam-electric plant fuel at a most attractive cost per B.t.u. Hence a 200-mile high-pressure pipe line has made natural gas the important fuel for San Francisco steam plants whereas a year ago oil was the principal fuel. Another and larger line now is under construction from the Kettleman field to the San Francisco Bay region. Similar lines are taking fuel south to Los Angeles where for many years gas has been an important steam plant fuel.

Any way it is looked at, it is evident that steam-electric advancement on the Pacific Coast will not reach its peak for some years to come.

Trends in Transmission Construction



San Bernardino—Seal Beach 110-kv. Line Near Riverside, Calif.

AMONG the very few important major transmission extensions or intersystem tie-lines, the Idaho Power Company, The Southern Sierras Power Company and the Montana Power Company have reported the most important construction during 1929. In extending its 50-kv. transmission system westward from Havre to Chester, and in strengthening its 50-kv. system northwestward from Vaughn to Conrad, the Montana company is developing a promising agricultural and oil area and laying the foundation for increased electric service to the area contiguous to the Canadian border.

Development of the eastern Oregon section is indicated by the construction of thirty miles of 132-kv. line by the Idaho Power Company. This represents an extension of the company's high-tension system "back bone" to the north and west from Ontario to Huntington (Ore.). The strength of mining activities in the Huntington area and an increased delivery of energy to the Eastern Oregon Light & Power Company from Huntington through Durkee undoubtedly underlie this new construction. It is of some significance in this connection to note that the Oregon company has decided to take power from the Idaho company in lieu of building either new steam or hydro plants of its own.

A major tie between two important companies will be effected upon the completion of the 62-mile 110-kv. San Bernardino-Seal Beach line now under construction by The Southern Sierras Power Company. This new circuit will make available to the eastern California company the steam-electric generating facilities of the major plant of the Los Angeles Gas & Electric Corporation. This tie should be of value and importance to both companies since it undoubtedly will expedite the economical development of a relatively large central generating plant strategically located with respect to water and fuel on the one hand, and on the other hand will provide needed capacity at the load end of a long system.

Perhaps one of the most notable trends in line construction during the past year or so is that represented by the growing use of multi-circuit steel towers. Right-of-way limitations and the concentration of generating capacity such as that occurring at Long Beach, where the Southern California Edison Company is putting the finishing touches on its second 100,000-kva. single-unit generator, have combined to make the multi-circuit tower an economic necessity. Tower line structures carrying as many as twelve 60-kv. circuits now are in service and construction work is under way at certain key points on the Southern California Edison Company's transmission system to permit the addition of other transmission lines of a lower voltage to the existing 220-kv. single-circuit transmission towers.

Transmission Line Circuit Mileage as Reported to Electrical West.

Line Potential (Kv.)	Actually completed 1925	1926	1927	1928	1929	Orig. proposed 1929	New proposed* 1930
30-50	132	326	246	333	340	15	122
51-70	356	151	524	659	310	41	257
71-110	436	385	93	166	65	60	163
111-165	197	000	163	106	33	150	21
220	17	235	338	117	...	...	414
Totals	1,138	1,097	1,364	1,381	748	266	977

*Figures include lines now under construction.

On the basis of expectancies as reported to ELECTRICAL WEST as of Jan. 1, 1930, there is reason to believe that there may be constructed during 1930 a total circuit mileage in transmission lines in excess of 1,500.

It is of some significance to note that 650 circuit miles, or 82 per cent of the total circuit mileage completed in 1929, was in circuits of a voltage less than 70 kv. While it appears inevitable that there will be heavy circuit mileage in this same voltage constructed during 1930, there are several major transmission lines of 110 kv. or higher voltage that will have to be completed or well under way before the close of 1930 in order to accommodate the power output of new generating plants that are under way now.

Too Late to Tabulate

(1) The California Oregon Power Company, Marshfield to Dixon (Ore.), 64.5 miles of 110-kv. single-circuit line strung on H-frame wood-pole structures (National Pole Company), using No. 394 Anaconda composite copper conductor and Locke No. 5800 insulators; average span 835 ft., maximum 3,260 ft.; completed 1929 at a cost of $541,000.

(2) The California Oregon Power Company, Bonanza to Sprague River (Ore.), 22 miles of 34-kv. single-circuit line on wood poles (Carbolineum Preserving Company), using No. 4 Anaconda bare copper conductor and Locke pin-type insulators Nos. 315 and 351; average span 400 ft., maximum span 400 ft.; under construction; to cost $40,000.

(3) Mountain States Power Company, Independence to Dallas (Ore.), 7.3 miles of 66-kv. single-circuit line on cedar poles (L. D. McFarland Company, and M. L. Bruce Company), using 2/0 Anaconda stranded copper and Westinghouse, Lapp, and Locke pin-type insulators and O.B. 10-in. strain units; average span 300 ft., maximum span 330 ft.; completed 1929 at a cost of $29,000.

Some Additions to Transmission Systems in the Eleven Western States During 1929-1930

Company	Location	Length (Miles)	Voltage (Kv.)	No. of Circuits	Supporting Structures	Conductors	Insulators	Spans (Ft.) Aver.	Spans (Ft.) Max.	Status	Cost (Estimated)
ARIZONA											
Arizona Edison Company	Naco to Douglas	27.0	44	1	Wood poles	No. 2 copper	O. B. pin type	250	300	Proposed, 1930	$ 70,000
Arizona Edison Company	Naco to Lowell	9.0	44	1	Wood poles	No. 2 cop., 3 str.	O. B. pin type	300	375	Completed, 1929	26,000
Central Arizona Light & Power Company	Phoenix to Chandler	20.0	40	1	Wood poles	No. 4 cop., 3 str.	O. B.	300	350	Completed, 1929 (16 miles joint const. on SRVWU Assn. poles)	20,000
Central Arizona Light & Power Company	Avondale to Buckeye	16.0	40	1	Wood poles	No. 4 cop., solid	Locke	200	250	Completed, 1929 (Orig. 11 kv., reinsulated for 40 kv.)	21,381
Salt River Valley Water Users' Association	Near Chandler	5.0	45	1	Wood poles (40 ft.)	No. 4 cop., 3 str.	Multi-part pin type	330	....	Completed, 1929 (To supply 1,000-kva. sub. for pumping plants)	9,994
Salt River Valley Water Users' Association	Old South Consolidated Plant to Stewart Mountain Dam	13.0	45	1	Wood poles (40-ft., H-frame)	2/0 cop. str.	Suspension, 4 units	500	....	Completed, 1929	.....
Salt River Valley Water Users' Association	Phoenix to Tolleson	7.5	45	1	Wood poles (50 ft.)	No. 4 cop., 3 str.	Multi-part pin type	265	....	Completed, 1929 (Joint construction with Cent. Ariz. Pwr. Co.)	16,333
Salt River Valley Water Users' Association	Phoenix to Mesa	16.0	45	1	Wood poles (50 ft.)	2/0 cop., 7 str.	Multi-part pin type	330	....	Completed, 1929 (Joint construction with Cent. Ariz. Pwr. Co.)	66,981
BRITISH COLUMBIA											
British Columbia Electric Railway Company, Ltd.	Seton Lake, Bridge River to Horn Payne Sub., Vancouver	130.0	220	1	Steel towers	795,000-circ. mil A.C.S.R.	Not decided	Not decided		Proposed for completion by 1932	
British Columbia Electric Railway Company, Ltd.	Ruskin hydro plant to Burnaby Sub., New Westminster	28.0	66	2	Wood poles, single circ.	Equiv. 300,000 circ. mil	Pin type	250	....	Under construction (Steel towers at 5 river crossings)	1,100,000
British Columbia Electric Railway Company, Ltd.	Stave Falls to Horn Payne Sub., Vancouver	33.0	60	1	Wood poles	300,000 circ. mil cop.	Pin type C.P.C.	175	....	Completed, 1929 (Third circuit from Stave Falls)	325,000
West Kootenay Power and Light Company, Ltd.	Bonnington Falls to Nelson	9.7	60	1	Wood poles (local)	90,000 circ. mil cop. str. Philips	Pin type, C.P.C.	200	875	Completed, Dec., 1928 (Built for 60 kv., operating at 20 kv.)	32,032
West Kootenay Power and Light Company, Ltd.	Nelson to Ymir	19.1	60	1	Wood poles (local)	90,000-circ. mil cop. str. Philips	Pin type, C.P.C.	200	652	Completed, Dec., 1928	51,025
CALIFORNIA											
Los Angeles Bureau of Power & Light.	Rec. Sta. "B" to Rec. Sta. "C"	10.7	132	2	Steel towers P.C.S.	500,000 circ. mil. cop., Anaconda	O.B. 9 suspension	750	....	Under construction	.....
Los Angeles Bureau of Power & Light.	Sta. 2 to Sta. 37	1.9	33	1	Wood poles	3/0 cop. str.	O.B. pin type	180	....	Completed, 1929	.....
Los Angeles Bureau of Power & Light.	San Fernando Valley—Peddler	1.9	33	1	Wood poles	No. 2 cop. solid	O.B. pin type	180	....	Completed, 1929	.....
Los Angeles Bureau of Power & Light.	Rec. Sta. "C" to Peddler system	3.5	33	1	Wood poles	1/0 cop. str.	O.B. pin type 66-kv.	180	....	Under construction	.....
Los Angeles Bureau of Power & Light.	St. John to Commonwealth Center	1.1	33	1	Fiber duct in concrete	750,000 circ. mil triplex Okonite	400 mils paper—"Hockstadter"	...	....	Completed, 1929	.....
Los Angeles Bureau of Power & Light.	Rec. Sta. "B" to Sta. 19	6.3	33	1	Wood poles	3/0 cop. str.	O.B. pin type	180	....	Completed, 1929	.....
Los Angeles Bureau of Power & Light.	Sta. 28 to Peddler system	2.1	33	1	Wood poles	2/0 cop. str.	O.B. pin type	180	....	Completed, 1929	.....
Los Angeles Bureau of Power & Light.	Sta. 28 to Sta. 21	4.6	33	1	Wood poles	3/0 cop. str.	O.B. pin type	180	....	Completed, 1929 (Portion of future line)	
Los Angeles Bureau of Power & Light.	Sta. 22 to Sta. 41	2.0	33	1	Wood poles	No. 2 cop. solid	O.B. pin type	180	....	Proposed	.....

*ABBREVIATIONS:—**Poles and Towers:** Benson, Benson Lumber Company; Chapin, Chapin Cedar Company; Cox, F. C. Cox; Johnston, Johnston-Davis Company; E.M.S.Co., E. M. Smith Company; Kaniksu, Kaniksu Cedar Company; Nedermyer, Nedermyer & Martin; P.C.S., Pacific Coast Steel Company. **Conductors:** Al.Co., Aluminum Company of America; American, American Copper Company; Am. Brass, American Brass Company; Anaconda, Anaconda Copper Mining Company; Okonite, The Okonite-Callender Cable Company, Inc.; Philips, Eugene Philips. **Insulators:** C.P.C., Canadian Porcelain Company; J. D., Jeffery-Dewitt Insulator Company; Lapp, Lapp Insulator Company, Inc.; Locke, Locke Insulator Corporation; O.B., Ohio Brass Company; Pinco, Porcelain Insulator Corporation; Pyrex, Corning Glass Works; Thomas, The R. Thomas & Sons Company; West., Westinghouse Electric & Manufacturing Company.

Some Additions to Transmission Systems in the Eleven Western States During 1929-1930

Company	Location	Length (Miles)	Voltage (Kv.)	No. of Circuits	Supporting Structures	Conductors	Insulators	Spans (Ft.) Aver.	Spans (Ft.) Max.	Status	Cost (Estimated)
Los Angeles Bureau of Power & Light	Sta. 15 to Sta. 6	3.2	33	1	Wood poles	3/0 cop. str.	O.B. pin type	180	....	Under construction	.....
Los Angeles Bureau of Power & Light	Station 28—Peddler	1.1	33	2	Fiber duct in concrete	1/0 3-cond.	400 mils paper—"Hockstadter"	...	....	Completed, 1929	.....
Pacific Gas and Electric Company	San Mateo City Limits to Redwood City	7.5	60	2	Steel towers P.C.S.	4/0 cop. str.	West. 6 susp.	800	990	Under construction	200,000
Pacific Gas and Electric Company	Salt Springs power house to Tiger Creek power house	17.0	110	1	Steel towers	4/0 cop. str.	Susp. 8 units	600	2,100	Proposed, 1930	300,000
Pacific Gas and Electric Company	Tiger Creek to Newark	110.0	220	2	Steel towers	Approx. 1 in. part copper, part aluminum	Susp. 14 in mountain section, 20 in Bay section	800	1,500	Proposed, 1930	3,960,000
Pacific Gas and Electric Company	Morgan Hill to Gilroy, Lagunitas to Salinas	17.0	110	1	Steel towers P.C.S.	3/0 cop. str. Anaconda	J.D. susp. 9 units	800	1,974	Under construction	275,000
Pacific Gas and Electric Company	Contra Costa to Columbia Steel Sub.	6.0	60	1	Steel poles	4/0 cop.	60-kv. 4-part pin type	400	450	Completed, 1929	87,000
Pacific Gas and Electric Company	Cherokee Lane to Woodbridge Sub.	5.0	60	1	Wood poles	No. 4 cop. str.	13-in. 3-part pin type	246	....	Completed, 1929	18,000
Pacific Gas and Electric Company	Herdlyn to West Side Sub.	5.5	60	1	Wood poles	No. 1 cop. str.	13-in. 3-part pin type	264	....	Completed, 1929	19,100
Pacific Gas and Electric Company	Manteca-West Side line to new Tracy Sub.	1.5	60	1	Wood poles	No. 2 cop. str.	13-in. 3-part pin type	264	....	Completed, 1929	14,900
Pacific Gas and Electric Company	Olema to Bolinas	10.5	60	1	Wood poles	No. 4 cop.	60-kv. 4-part pin type	264	....	Completed, 1929	47,000
Pacific Gas and Electric Company	Mt. View to foothills	5.0	60	1	Steel poles	3/0 cop.	pin type	400	....	Completed, 1929	62,100
Pacific Gas and Electric Company	San Mateo Sub. to south	1.2	110	2	Steel towers	4/0 cop.	Suspension	800	....	Completed, 1929	43,400
San Diego Consolidated Gas & Electric Company	Escondido to El Cajon	28.5	66	1	Wood poles	No. 1 cop. str.	Susp. 5, str. 6	350	....	Proposed, 1930	161,230
San Diego Consolidated Gas & Electric Company	Sta. "A" to Mexican Border	16.1	33	1	Wood poles Benson	2/0 cop. str. Anaconda	Pyrex pin type No. 441	300	910	Completed, 1929	87,285
San Diego Consolidated Gas & Electric Company	Sta. "B" to Sta. "F" loop	11.9	33	1	Wood poles Benson	4/0 cop. str., No. 1 cop. str. Anaconda	Pyrex pin type and O.B. No. 1055G1	175	380	Completed, 1929 (Re-insulation only)	12,430
San Joaquin Light & Power Corporation	Tulare Lake to Kettleman	11.8	60	1	Wood poles	1/0 cop.	O.B. No. 25620, 4 units	212 min.	1,300	Completed, 1929	47,837
San Joaquin Light & Power Corporation	Henrietta Tap to Midlake Sub.	9.1	60	1	Wood poles	No. 2 cop. H.D.	O.B. No. 25622 4 units	335	355	Completed, 1929	23,893
San Joaquin Light & Power Corporation	Merced Falls to Briceburg	20.5	60	1	Steel towers	1/0 cop. str.	J.D. No. A257, 4 units	270 min.	2,890	Completed, 1929	111,121
San Joaquin Light & Power Corporation	Sanger Fresno to Ashlan Sub., Fresno	13.7	110	1	Steel poles, steel towers	250,000 circ. mil	J.D. No. A257, 4 units	532	609	Completed, 1929	133,602
San Joaquin Light & Power Corporation	Ashlan to Kearney	8.4	70	1	Wood poles	397,500 circ. mil	J.D. No. A257, 4 units	330	345	Completed, 1929	38,199
San Joaquin Light & Power Corporation	Wilson to Ashlan (Fresno)	50.0	110	1	Steel towers (2-circuit 220 kv.)	A.C.S.R.	O.B. strain, Locke susp., 7 units	750	1,600	Under construction	750,000
Southern California Edison Company	Eagle Rock Blvd. to Glendale Sub.	2.2	66	1	Wood poles	4/0 cop. str.	Locke No. 5996, 5 susp., 5-dead-end	175	....	Completed, 1929 (Re-insulated and converted from 16 kv.)	4,300
Southern California Edison Company	Laguna Bell west line to L.A. River	1.3	66	3	Steel towers P.C.S., 4-circ.	4/0 cop. str.	Locke No. 5996	600	....	Completed, 1929	42,175
Southern California Edison Company	Eagle Rock Sub. get-away	1.0	66 16 Future	8 2 2	3 4-circ. and 6 12-circ. steel towers, P.C.S.	4/0 cop. str.	Locke No. 5996	752	885	Completed, 1929	84,636
Southern California Edison Company	Borel Hydro plant to Monolith Sub.	38.0	66	1	Wood poles H-frames	3/0 cop. solid	Locke No. 5996	...	....	Completed, 1929 (One circ. dismantled and old structures replaced with H-frames)	.....
Southern California Edison Company	Newmark-Fuente lines to Anita Sub.	5.0 2.8	66 66	2 1	Wood poles	4/0 cop. str.	Hewletts and Lapp No. 2300	150	....	Completed, 1929	65,750
Southern California Edison Company	McNeil-Ripple line to Glendale Sub.	2.0	66	1	Wood poles	4/0 cop. str.	Locke No. 5996, 5 susp., 5 dead-end	175	....	Completed, 1929	26,800
Southern California Edison Company	Chino to Pedley.	12	66	1	Wood poles	4/0 cop. str.	Lapp No. 2300 and Locke No. 5800, 5 susp., 5 D.E.	180	....	Completed, 1929	62,250
Southern California Edison Company	Laguna Bell to L.A. B.P. &L. Rec. Sta. "B"	5.0	66	1	Wood poles, steel towers	4/0 cop. str.	Locke No. 5996	...	....	Completed, 1929 (Additional circuit on existing structures)	17,000
Southern California Edison Company	Tap from Goodrich lines to Sampson Rubber Co.	0.5	66	2	Steel poles, lattice	2/0 cop. str.	Locke No. 5996, 5 susp., 5 dead-end	300	....	Completed, 1929	7,000
Southern California Edison Company	Redlands to Highlands	3.5	33	1	Wood poles	2/0 cop. str.	Locke No. 5226 pin type, Locke No. 5996 dead-end	175	....	Completed, 1929	8,700
Southern California Edison Company	Montebello to Newmark-Fuente line	3.5	66	2	Wood poles, Steel poles (lattice)	4/0 cop. str.	Locke No. 5996	...	....	Under construction	55,000
Southern California Edison Company	Laguna Bell Sub. to Whittier Blvd.	2.3	66	4-5-6	Steel poles, steel towers, Multi-circuit	4/0 cop. str.	Locke No. 5800	789	1,096	Under construction (4 circuits through, others part way)	52,612
Southern California Edison Company	Marine Sub. to Jefferson St.	5.0	66	1	Wood poles	4/0 cop. str.	West. No. 133	...	....	Under construction (Additional line on existing pole line)	20,250
Southern California Edison Company	Laguna Bell Sub. to Ferguson Drive	2.3	220	2	Steel towers	666,600 circ. mil. aluminum	Std. B 0201	881	1,071	Under construction	45,835
Southern California Edison Company	La Fresa Sub. to Victoria Ave.	0.7	66	3	6 circ. steel towers E. M. S. Co.	4/0 cop. str.	Locke No. 5800, 5 units	746	900	Under construction	27,124
Southern California Edison Company	La Fresa Sub. to Western Ave.	1.3	66	2	6 circ. steel towers E. M. S. Co.	4/0 cop. str.	Locke No. 5800, 5 units	785	1,000	Under construction	42,437

Some Additions to Transmission Systems in the Eleven Western States During 1929-1930

Company	Location	Length (Miles)	Voltage (Kv.)	No. of Circuits	Supporting Structures	Conductors	Insulators	Spans (Ft.) Aver.	Spans (Ft.) Max.	Status	Cost (Estimated)
Southern California Edison Company	Lighthipe to La Fresa	9.7	220	2	2 circ. steel towers	666,600 circ. mil. ACSR and 692,000 cop. bronze, Al. Co., and Am. Brass	Lapp No. 2094 and 5085	914	1,335	Under construction	370,430
Southern California Edison Company	La Fresa to El Segundo	6.3	66	7-9-10	8-10-12 circ. steel towers E. M. S. Co.	4/0 cop. str.	Locke No. 5800, 5 units	...	....	Under construction (7 circuits through, others part way)	288,592
The Southern Sierras Power Company	Arlington to Corona	7.9	33	1	Wood poles Chapin	No. 4 cop. str. Anaconda	Pinco pin type	264	422	Completed, 1929	20,000
The Southern Sierras Power Company	Victor to Victorville	5.9	33	1	Wood poles Chapin	2/0 cop. str. Anaconda	O. B. pin type	300	300	Completed, 1929	19,000
The Southern Sierras Power Company	San Bernardino to Seal Beach	61.7	110	1	Steel poles P.C.S.	2/0 cop. str. Anaconda	Susp., West., & J.D., 8-9 units, 9-10 units in strain strings	660	1,214	Under construction (To connect with L.A.G.& E. Steam plant.)	590,000
The Southern Sierras Power Company	Perris line near Colton to Loma Linda Sub.	1.9	33	1	Wood poles Chapin	No. 4 cop. str. Anaconda	O.B. pin type	220	224	Completed, 1929	4,900
COLORADO											
Western Colorado Power Company	Tacoma Plant to Silverton	15.0	44	1	.....	.....	.....	....	....	Completed, 1929 (Line Reconstructed)	.....
IDAHO											
Idaho Power Company	Ontario to Huntington (Oregon)	30.3	132	1	Wood poles H-frame Kaniksu	250,000 circ. mil. 12-str. cop. Anaconda	West., Thomas, O. B., Locke, 10 units	600	1,370	Completed, 1929	197,172
Idaho Power Company	Huntington to Lime (Oregon)	5.3	66	1	Wood poles H-frame Kaniksu	No. 1 7-str. cop. Anaconda	West, 5 units	500	900	Completed, 1929	22,033
Idaho Power Company	Looping Huntington-Lime and Weiser-Gypsum lines (Oregon)	5.3	66	1	Wood poles Kaniksu	No. 1 cop. str. Anaconda	Locke, 5 units	300	985	Completed, 1929	24,707
Idaho Power Company	Looping Shoshone Falls-American Falls Line to U.S.R.S. Minidoka plant	2.8	132	1	Wood poles H-frame Kaniksu	250,000 circ. mil cop. str. Anaconda	Locke, 10 units	600	700	Completed, 1929	25,979
MONTANA											
The Montana Power Company	Mystic Lake to Columbus	42.0	50	1	Wood poles	91,000 circ. mil cop. Anaconda	Pin type	300	....	Under construction	84,000
The Montana Power Company	Vaughn to Conrad	60.0	50	1	Wood poles	No. 8 cop. str. Anaconda	Pin type, 1-piece Pyrex	250	....	Completed, 1929	90,000
The Montana Power Company	Havre to Chester	60.0	50	1	Wood poles	No. 8 cop. str. Anaconda	Pin type, 1-piece Pyrex	300	....	Completed, 1929	90,000
NEVADA											
Sierra Pacific Power Company	Truckee to Portola (California)	41.6	60	1	Wood poles Nedermyer	No. 4 cop. str. Anaconda	Pin type, Locke	220	275	Completed, 1929	98,000
OREGON											
Portland Electric Power Company	Sta. "M" (Estacada) to Beaver Creek	10.0	57	2	Steel towers	2/0 cop. H.D., str. Anaconda	O.B. No. 25622, 4 susp., 5 strain	Not determined		Proposed, 1930 (To replace single-circuit wood pole line)	108,500
Portland Electric Power Company	Portland to St. Helens	27.0	57	1	Wood poles local	1/0 cop. H.D., str. Anaconda	O.B. No. 12552 and 25622 4 susp., 5 strain	200	....	Proposed, 1930 (Line now operating at 33 kv., to be re-insulated and partly re-located on private r/w.)	45,000
UTAH											
Utah Power & Light Company	Santaquin plant to Wales	38.2	44	1	Wood poles, Cox	No. 2 cop. str., M.H.D. Anaconda	Pin type, Locke No. 1044	325	....	Completed, 1929	.....
Utah Power & Light Company	Tooele to Metals Red. Co.	4.9	44	1	Wood poles, Cox	No. 8 cop. str., M.H. D. Anaconda	Pin type, Locke No. 1055	325	....	Completed, 1929	.....
WASHINGTON											
City of Seattle, Department of Lighting	Reflector Bar to Seattle	120.0	220	1	Steel towers, 2 circ.	500,000 circ. mil cop. or equiv. A.C.S.R.	.....	600	2,000	Proposed, 1930-31 (Orig. proposed 1928, as 165-kv., wood-pole line. Then proposed 1929, as 220-kv., steel tower line.)	2,000,000
City of Tacoma, Light Division	Tie from Tide Flats to Cushman Sub.	9.0	50	1	Wood poles	4/0 all-aluminum, str.	Thomas No. 3060, J.D., No. A257	125	570	Completed, 1929	36,000
Peoples West Coast Hydro-Electric Corporation	South Bend to Ilwaco	40.0	33	1	Wood poles, Johnston	No. 4 and No. 2 cop. Anaconda	Locke pin type, J.D. strain	300	750	Under construction (Operation at 13.2 kv. initially.)	.....
Puget Sound Power & Light Company	Issaquah to Redmond	11.0	55	1	Wood poles	2/0 cop.	66-kv. pin type	300	....	Proposed, 1930	35,000
Puget Sound Power & Light Company	Olympia sw. sta. to West Olympia Sub.	41.0	55	1	Wood poles	No. 4 cop.	66-kv. pin type	...	....	Proposed, 1930	.....
The Washington Water Power Company	Spokane, Freya St., to freq. chg. sta.	1.5	60	1	Wood poles single circ.	No. 8 cop., 7 str. Anaconda	J.D., 4 susp., 5 strain	367	530	Under construction	12,104
The Washington Water Power Company	Spokane to Kellogg	67.0	110	1	Wood poles H-frame	250,000 circ. mil cop. Anaconda	Locke cap & pin Socket type, 6 susp., 7 strain	500	2,900	Under construction	799,000
The Washington Water Power Company	Chelan to Stratford	49.0	110	1	Wood poles H-frame	250,000 circ. mil cop. Anaconda	O.B. cap & pin socket type, 6 susp., 7 strain	450	1,835	Completed, 1929	399,685
Western Washington Electric Light & Power Company	Raymond to Aberdeen	28.0	66	1	Struct. steel poles P.C.S.	4/0 cop., 7 str. American	Thomas, ball & socket 6 susp., 7 strain	600	1,600	98% complete, 1929	200,000
WYOMING											
U. S. Bureau of Reclamation	Shoshone Dam to Cody	6.0	33	1	Steel towers & wood poles	1/0 A.C.S.R.	O.B. 10-in. susp. & pin type	400	1,100	Under construction (Parallel line to existing circuit. Cost includes switching equipment.)	25,000

***ABBREVIATIONS:—Poles and Towers:** Benson, Benson Lumber Company; Chapin, Chapin Cedar Company; Cox, F. C. Cox; Johnston, Johnston-Davis Company; E.M.S.Co., E. M. Smith Company; Kaniksu, Kaniksu Cedar Company; Nedermyer, Nedermyer & Martin; P.C.S., Pacific Coast Steel Company. **Conductors:** Al.Co., Aluminum Company of America; American, American Copper Company; Am. Brass, American Brass Company; Anaconda, Anaconda Copper Mining Company; Okonite, The Okonite-Callender Cable Company, Inc.; Philips, Eugene Philips. **Insulators:** C.P.C., Canadian Porcelain Company; J. D., Jeffery-Dewitt Insulator Company; Lapp, Lapp Insulator Company, Inc.; Locke, Locke Insulator Corporation; O.B., Ohio Brass Company; Pinco, Porcelain Insulator Corporation; Pyrex, Corning Glass Works; Thomas, The R. Thomas & Sons Company; West., Westinghouse Electric & Manufacturing Company.

1929

PASSES IN REVIEW—ITS RECORD OF LOAD BUILDING, APPLIANCE SALES AND BUSINESS GROWTH

comm revue

Range, Water Heater, and Refrigerator Sales

1929 Sales
Quotas 1930

CENTRAL STATIONS	Ranges		Water Heaters		Refrigerators	
	1929	1930	1929	1930	1929	1930
B. C. Elec. Ry. Co.—Vancouver	1,246	1,000	276	250	75	.....
B. C. Elec. Ry. Co.—Victoria	167	200	81	100	264	350
California Oregon Pwr. Co.	508	.....	238	.....	170	.....
Central Ariz. Lt. & Pwr. Co.	357	500	264	375	630	1,050
Coast Co. Gas & Elec. Co.	150	175	100	125	200	500
Great Western Power Co.	2,200	3,100	520	800	.....	.....
Idaho Power Company	3,327	3,565	2,224	1,750	844	1,200
Los Angeles Bur. Pwr. & Lt.	400	.....	125	.....	15,000*	.....
Mountain States Pwr. Co.	914	.....	502	.....	572	.....
Northwestern Elec. Co.	1,376	1,800	200	500	160	250
Pacific Gas & Elec. Co.	5,144*	6,000*	2,250*	2,900*	22,000‡	28,000‡
Pacific Pwr. & Lt. Co.	1,195	2,000	639	1,500	899	1,100
Portland Elec. Pwr. Co.	1,350	2,000	1,028	1,200	205	480
Public Service Co. of Colo.	570	800	32	100	1,503	1,700
Puget Sound Pwr. & Lt.	6,600*	7,500*	1,850*	2,000*	3,000*	3,200*
Salt River Val. Water Users	217	250	49	100	51	75
San Diego Cons. Gas & Elec.	434	600	163	300	1,200*	1,500*
San Joaquin Lt. & Pwr. Corp.	1,828*	1,575*	1,232*	1,040*	1,667*	3,000*
Seattle Lighting Dept.	3,000	3,000	1,000	1,100	.....	†
Sierra Pacific Power Co.	168	200	61	100	232	400
So. California Edison Co.	6,250	7,500	1,900	3,000	11,000*	1,500
So. Colorado Power Co.	440	604	73	110	314	400
So. Sierras Power Co.	550	800	250	500	500	1,000
Tacoma Dept. of Lt. & Pwr.	784	.....	556	.....	745	.....
Utah Power & Light Co.	.....	.....	.....	.....	.....	.....
Washington Water Power Co.	1,270	1,500	1,261	1,500	.....	.....
Western Colo. Power Co.	75†	150‡	35†	75‡	40‡	50‡

*Including estimated dealer sales. ‡Estimated dealer sales alone. †Will start selling this year.

WEST of the Rockies, the advertisements usually say, things are a bit higher. Certainly this is true of electric appliance sales, agricultural power use, and general commercial development, regardless of what happened on the New York stock exchange. What is more, if the quotas for 1930 are any indication, these will remain higher.

With surprising accuracy Western predictions proved true last year. Despite stock market qualms, the 1930 predictions likewise have a ring to them which makes them sound as true as those of last year have already proved themselves to be.

Borrowing slide rules from the engineers, commercial executives last year added up the possibilities, divided these by their sales personnel and whatever other factors were necessary, and derived therefrom the necessary quotas. Then they set about to match these quotas item by item with sales. Adding up the results at the end of the year the balance is practically even. This in itself establishes the soundness of the methods of prediction these commercial executives employ.

By similar methods 1930 quotas have been set. These may be termed conservatively low. Whatever they may be termed, the quotas certainly reflect nothing but a confidence that they will be met and surpassed.

Actions of this kind speak louder than all the official pronunciamentos that "everything is sound." By their actions Western utilities shall be known as undaunted—whether stocks go up, down, or like the crab, laterally. Electricity must be sold. The public needs and wants the convenience and comfort it brings. Fortunately

PLANS AND PROGRAMS, QUOTAS AND BUSINESS OUTLOOK FOR ELECTRIC UTILITIES DURING

1930

ercial

nothing much can alter that. On this page and the one facing is a summary of the evidence. The detailed depositions of the commercial executives of Western companies follow in the subsequent pages. Each of these is well worth careful reading. Each executive, in his own words and for his own individual company, sets forth the progress made during 1929 and the program he has established for his company during 1930. Each records the more spectacular sales events of the past year. This feature in itself abounds with ideas for the sales manager and the salesman. Illustrated by pictures of interest and facsimiles of particularly good advertising pieces, the fourteen pages which follow are a fascinating portrayal of commercial growth in the electrical industry.

The tables on this and the facing page are cross-section pictures. They cut through all companies. In one table the sections are cut across the range sales line, the water heater line, and the refrigerator sales curve. In the other the cross section cuts straight through the heart of commercial achievement—the kw.-hr. consumption per domestic customer. As indices of growth these two tables are highly significant.

Reference to the figures given in last February's number of ELECTRICAL WEST, pp. 86 and 87, revives memory of 1929 quotas. In 1928, for instance, 40,000 ranges were sold in the territories of Western utilities. From this figure quotas for 1929 were established at over 50,000 ranges. Actual sales reported did not quite reach this figure, although they did reach approximately 47,000 ranges.

In 1928 water heaters to the extent of 13,000 were sold. With this figure before them commercial executives foresaw big gains in water heater sales during 1929. The combined quotas were established at 20,000 water heaters. From a summary of reports of sales it appears that this has been topped. Water heaters, then, made a gain during 1929 of 7,000 over the previous year, a truly phenominal gain for this appliance. That great strides in sales of water heaters are expected in 1930 is attested by the quotas for this year, which aggregate 24,000 of these appliances.

Refrigerator sales likewise topped expectations. In 1928 it was estimated that 25,000 units had been sold in the eleven Western states. Accordingly, quotas were set for 1929 which totaled 40,000 refrigerators. Figures given for sales last year would indicate that at least 64,000 units had been sold. Upon this basis the quotas for 1930 aggregate 66,000 units, a conservative enough figure in view of the popular demand for domestic refrigerators.

To place the kw.-hr. per domestic consumer upon a comparable basis, commercial executives were asked to report last year's figures and to revise former year's figures in accordance with the N.E.L.A. kilowatt-hour contest rules of last year. The figures in the table at the top of the page are the revised figures except as otherwise noted. In some cases the figures for the last month were estimated in order that a report might be made.

This time 23 companies reported such figures whereas but 17 reported last year. Of the 23 there were six whose average domestic consumption was well over 1,000 kw.-hr. One company raised its consumption 116 kw.-hr. during the year, two companies raised theirs over 90 kw.-hr. and five companies over 80 kw.-hr. per domestic consumer. All others reported substantial increases.

Kw-hr. Per Residential Consumer

COMPANY NAME	1929	1928	1927	1926
B. C. Elec. Ry. Co.—Victoria	700	670	660	540
California Oregon Power Co.	.....	1,600	1,458	1,296
Central Ariz. Lt. & Pwr. Co.	588	472	445	347
Great Western Power Co.	750	690	576	547
Idaho Power Company	1,252	1,162	.....	.....
Los Angeles Bur. Pwr. & Lt.	478	443	398	.....
Northwestern Electric Co.	1,103	1,019	938	816
Pacific Gas & Electric Co.	630	.....	.....	439
Pacific Power & Light Co.	994	964	687	531
Portland Electric Power Co.	924	853	760	674.9
Public Service Co. of Colo.	385.6	352.5	332.9	.....
Puget Sound Power & Light Co.	926	846	763	650
San Diego Cons. Gas & Elec. Co.	496.3	.....	.....	.....
Salt River Valley Water Users Ass'n.	1,241†	1,913	1,613	1,336
San Joaquin Light & Pwr. Corp.	835	758	642	546
Seattle Lighting Dept.	1,023*	936	864	.....
Sierra Pacific Power Co.	719.5	.....	620.2	.....
So. Calif. Edison Co.	640	572	513	444
So. Colorado Power Co.	524.9	441.9	387.5	331
So. Sierras Power Co.	690	596	562	501
Tacoma Dept. of Lt. & Pwr.	1,337	1,285	.....	.....
Utah Power & Light Co.	.....	.....	.....	.....
Washington Water Power Co.	759	.....	.....	.....

All figures based on N.E.L.A. contest rules unless otherwise noted. †Not on N.E.L.A. basis. *Estimated.

Vancouver, B. C., at night—a view from the mountains above North Vancouver. Street lighting has been extensively developed

"Opened New Store at North Vancouver"

By EDMOND E. WALKER

Sales Engineer, B. C. Electric Railway Company, Ltd., Vancouver

WE REGRET that our statistics referring to domestic consumption of electricity will not be available until the latter part of the present month.

The information we are giving refers to our lower mainland system and does not include Vancouver Island which is operated as a separate unit.

1. The number of electric ranges added to our system during 1929 was 1,246. Owing to the power shortage which we have experienced the quota for 1930 will probably be 1,000 ranges.

2. The number of water heaters added to our system during 1929 was 276. Our quota for these for 1930 will probably be 250.

3. Seventy-five refrigerators were sold by us in 1929. We are unable to determine the number sold by other dealers in our territory, nor are we, at the moment, prepared to state our quota for 1930.

4. Our figures for 1929 are expected to show an increase of about 4,000 domestic consumers. Consumption per domestic customer will probably show an increase of about 12 per cent.

The increase in connected load to our system for all classes of consumers will be about 25,000 kw. for 1929, an increase of about 10 per cent. In the industrial field among the larger loads added were the following:

	Hp.
Lumber mills	1,500
Flour mills	350
Grain elevators	1,000
Cold storage plants	800
Department stores	600
Office buildings	600
Iron and steel industry	500

A considerable increase in the number of electric bake ovens was observed during the year. One of our consumers placed an order for a 3,000-loaf-per-hour traveling type bake oven and this will be in operation by the end of this month.

Our merchandise department continued to show improvement during the year and in December, 1929, we opened a new showroom in North Vancouver, B. C.

Up until the first of December, 1929, our merchandise sales showed a gratifying improvement over the previous year. Owing to abnormal weather conditions, in common with other power companies on the Coast, we suffered from a shortage of power. No curtailment of industry was necessaary but our range and water heater sales programs were halted. As consumers were asked to voluntarily conserve electrical energy the situation had a marked effect on our merchandise sales.

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"Steady Growth of Island Expected to Continue"

By S. J. HALLS

Manager, Light and Power Department, B. C. Electric Railway Company, Ltd.

THE steady and definite growth of the population and industry which Vancouver Island has been experiencing during the past few years is expected to continue, and 1930 promises continuous activity in the basic industries, lumbering, shipyard repairs, mining and cement manufacturing.

Construction promises to be extensive with many homes and apartment blocks to be built, and also some considerable addition to the business section is expected.

During the coming year we expect to add in excess of 1,000 new consumers to our system and somewhat more than 2,000 hp. in commercial power. We intend to continue our policy of making extensions to rural districts. This policy in the past has given very desirable results.

Lighting—During the year 1929 the company added 975 lighting consumers to its system, making a total of 19,867 connected; the increase in lighting was 2,691 kw., making a total connected load of 20,647 kw. The average kw.-hr. consumption of the domestic consumers has risen from 670 in 1928 to 700 per consumer in 1929.

Power—There were added to our system 34 power consumers during the year, making a total of 501 power consumers. The load was increased by 1,671 hp. and now totals 36,429 hp. One fairly large consumer, the Victoria Cold Storage Terminal Warehouse, Ltd., was connected with a total connected load of 600 hp.

1. Ranges added to system in 1929 167
   Quota for 1930 200
2. Water heaters added in 1929 81
   Quota for 1930 100
3. Refrigeration—Total domestic and commercial installations added in 1929 264
   Quota for 1930 350

Merchandising—Our merchandising department has had a successful year and the same results have been experienced by the local electrical trade generally. The volume towards the end of the season suffered somewhat due to recent economic conditions, but we look to an early revival and face the new year confidently. During the past few months we entered the radio field and are quite pleased with the results. Radio and refrigerator sales will be boosted somewhat during the coming year. We believe that the merchandise outlook for 1930 gives reason for optimism.

▲

"Have Added Illuminating Engineer to Sales Staff"

By PIERRE VINET

New Business Manager, Coast Counties Gas & Electric Company

REGARDING our commercial work, during the latter part of 1929 we added an illuminating engineer, Milo Cain, to the New Business Department. Mr. Cain devotes his entire time to developing floodlighting, interior commercial, show window and decorative lighting load, also the sale of electric signs and commercial refrigeration. This department, we believe, is going to prove itself very beneficial to both the company and the consumers in this division. Business conditions look very promising for 1930, and we are looking forward to a most successful year in our commercial department.

1. During the year 1929 it is estimated that the number of electric ranges added to our system will total 150, and we have a quota of 175 for 1930. A most successful range campaign was conducted in all of our districts during the fall of 1929.

2. It is estimated that a total of 100 electric water heaters were added to our load in 1929, with a quota of 125 for 1930. Successful water heater campaigns were conducted during the year, one in the spring and one in the fall.

3. Refrigeration sales in our district have been very favorable during 1929, with approximately 200 added during that year. We have a quota of 500 for 1930, as we plan very extensive campaigns on refrigeration during the year. A successful six weeks' campaign on refrigeration was conducted during the past summer.

4. Figures are not available for the average domestic consumption of electricity for the past three years. However, an average of approximately 71.9 kw.-hr. per consumer is the record for the first eleven months of 1929. This average is obtained by adding the total kw.-hr. sold for domestic purposes, and dividing by the total number of consumers.

"We Concentrate on the Load Builders"

By A. F. MORAIRTY

Assistant General Manager, Central Arizona Light & Power Company, Phoenix

FUNDAMENTAL as a principle of our sales department is the concentrating of 80 per cent of our activities on the selling of the load builders, namely, ranges, refrigerators and water heaters. We also keep the small appliance sales up by spectacular advertising campaigns in order to bring the customers into the store. In other words, we treat the small appliances on the "Come and get it plan" by supplying some incentive for the trip to the office, such as a premium or special price, etc. We design the small appliance campaigns so as not to detract the efforts of the regular sales organization from the three load builders.

The rather large increase of 1929 over 1928 for consumption per residential consumer was due to everlastingly pounding on the selling of the three load builders. The contests arranged between the small towns surrounding Phoenix and between the various district salesmen in Phoenix are based entirely on the three major appliances. We gave prizes for the greatest increase in kilowatt-hours per consumer.

In addition to the program sketchily described in the foregoing, the commercial department undertook three other endeavors during 1929.

1. *Home service department* located in the basement of our office building is a prettily decorated and equipped home service department. It is in charge of Miss Gladys B. Price, a trained home economist whom we secured from Portland. Miss Price's education and experience in this work on the Pacific Coast has aided her in making her department remarkably successful from the start.

During 1930 weekly cooking schools will be held in the Phoenix office and monthly cooking schools will be held in the district offices of the small towns surrounding Phoenix. The home service department is also offered to the 35 women's clubs in the Salt River Valley and to a number of other civic organizations for their meetings, all of which take advantage of this offer and hold not only their business meetings but also their social affairs in our building.

Of course it is not necessary to state that the merchandise department is entirely divorced from this endeavor. The results from the work will be accumulative and better public relations, more use of the present appliances and the purchasing of more appliances will follow.

2. *Another feature* was the opening of the Tempe office designed after the Spanish type of architecture. The opening of this office building brought thousands of the Tempe citizens to the doors and marked the culmination of good public relations in a town which but a year ago was municipally operated.

3. *Our completely electrified home* was opened simultaneously with the Tempe office. In the opening of the Tempe electric home we wished to tpyify the home of the average small consumer, thereby bringing to public attention the fact that such a home owner could afford to completely electrify his home with the favorable rates we offer.

4. *The third endeavor* of the commercial department was that of creating better public relations on such occasions as Edison Day and the Christmas Spirit Contest. An accompanying picture is that of the crowd sitting outdoors on the evening of Oct. 21, listening to the Edison Day program, with speeches by the governor of the state, city and county officials, and prominent citizens. On this occasion the new county courthouse was dedicated by means of a flood of light.

The Christmas spirit contest was far more successful this year than heretofore as thousands of homes were decorated for the Christmas season.

Statistics regarding our achievements for the commercial department for 1929 are as follows:

1. Electric ranges added to our system during 1929	357
Our quota for 1930	500
2. Water heaters added to our line during 1929	264
Our quota for 1930	375
3. Refrigerators added to our system during 1929	630
Our quota for 1930	1,050

Owing to the fact that our company is a combination gas and electric company we do not attempt to sell electric ranges or water heaters in the gas district. Electric ranges and water heaters are sold outside the gas district and to the small towns, which have about 3,000 residential consumers.

Domestic consumption figures in accordance with the N.E.L.A. definition are as follows:

1926	1927	1928	1929
347	445	472	588

The small increase of 1928 over 1927 was due to the acquisition of the small towns surrounding Phoenix which added a low consumption per residential consumer. Note how this was overcome during 1929.

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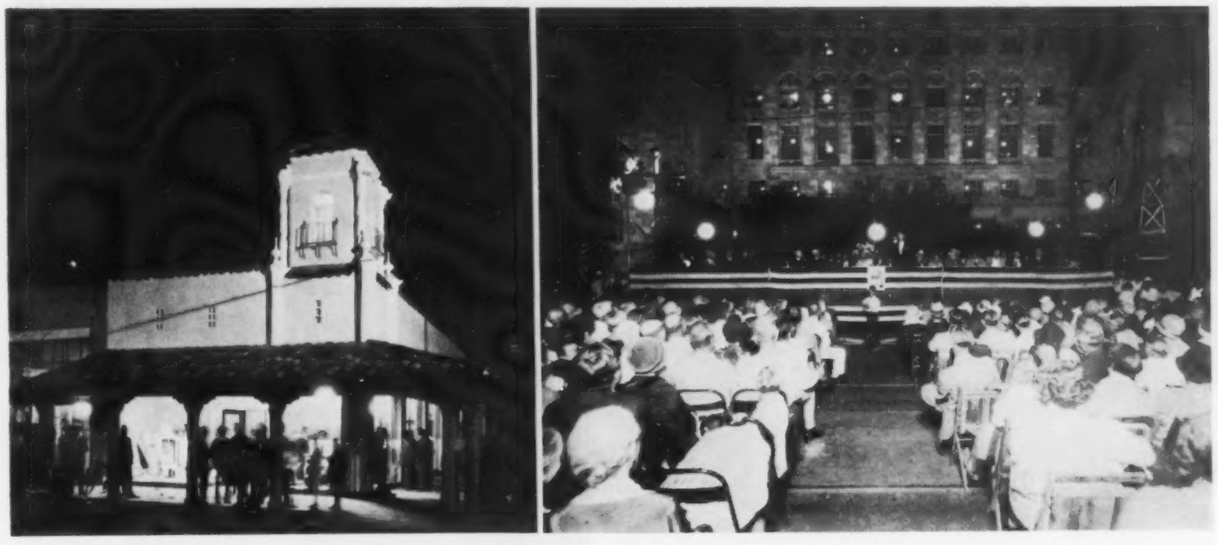
"2,200 Ranges, 520 Water Heaters Sold in 1929"

By A. M. FROST

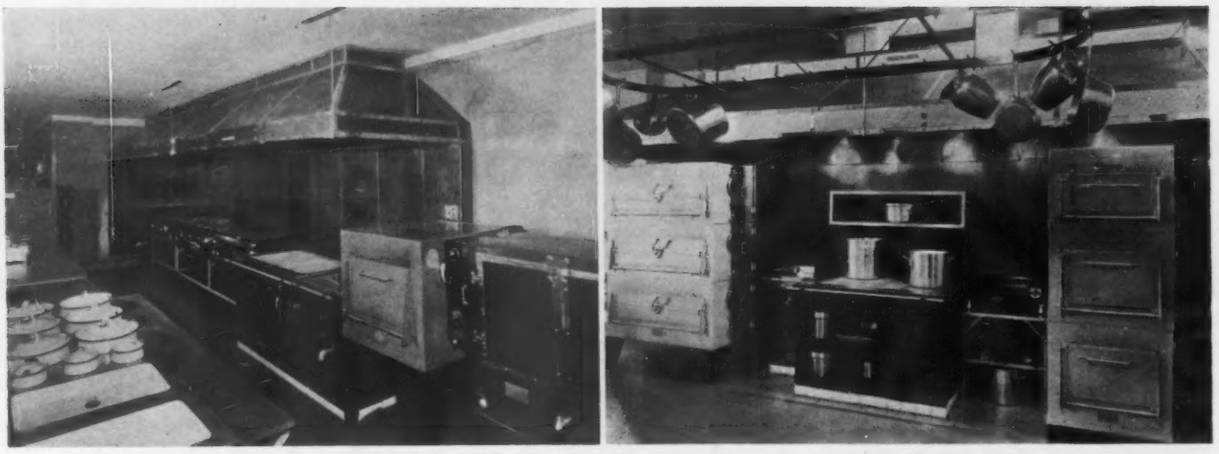
General Sales Manager, Great Western Power Company of California

DURING the year 1929 we increased our number of consumers 5 per cent and our connected load 12 per cent over the year 1928.

Building in the Bay area has been very slow during the last year. How-



New Tempe office of the Central Arizona Light & Power Company at left, and at right the Light's Golden Jubilee celebration in front of the floodlighted Maricopa County court house

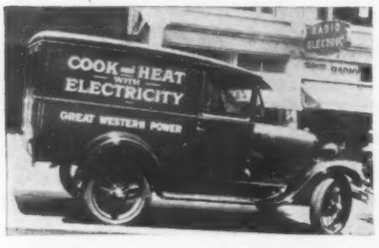


Last year the Bureau of Power and Light installed a complete line of electric restaurant equipment in its showroom (left). One of the results of this demonstration equipment is the Richfield Building cafeteria (right) where 81 kw. of electric equipment does all the work

ever, we have put forth a lot of effort for the promotion of our domestic load. We have had a number of campaigns for the sale of electric ranges and water heaters, have held a number of cooking schools and demonstrations, and have participated in fairs, food shows, dairy shows, and other expositions of this character. Our electric ranges have been in operation and prizes have been given for foods cooked electrically.

We sold 2,200 electric ranges and 520 water heaters during the past year, and have established as our bogey for 1930 3,100 ranges and 800 water heaters. We also expect to put considerable effort into the sale of electric space heating next fall. We will carry on during 1930 practically a parallel activity as compared with 1929. Each power salesman and merchandising salesman is being given a definite bogey to work on, and certain prizes will be allotted to the men making the greatest percentage of their bogey at certain times during the year.

No large industrial installations have been secured during the past year, but we believe the outlook for 1930 in the Bay territory is particularly bright, and that a considerable industrial expansion may be anticipated, particularly for the East Bay territory. Dur-



One of many trucks that circulate the electric idea around and about San Francisco as they do their daily chores

ing the year 1929 we made a strenuous effort toward the development of industrial loads and have secured 2,450 kw. which covers a large number of interesting applications. For 1930 we have set our bogey for industrial heating at 3,500 kw.

We believe there is a great opportunity for increasing our industrial and commercial lighting loads for the benefit of our consumers as well as ourselves. We hope to be able to engage in a lighting promotional campaign before the year is out. We have not as yet fully developed our plans.

▲

"Commercial Advertising Part of Our Program"

By Burdett Moody

Business Agent, Bureau of Power and Light, Los Angeles

INFORMATION that follows is, as you know, not the result of direct merchandising by the Bureau of Power and Light, but rather is produced by load building co-operation on our part in the activities of specialized groups in domestic appliances, in commercial and industrial heating, in power applications generally, and in illumination. These men act with the distributors, dealers and others in the industry in the interests of the consumer in obtaining the greatest benefit in his use of electrical energy. Commercial advertising is a part of our program.

The figures given are the result of our own information and estimates obtained from distributors and dealers in this territory and are concerned only with our own system, not including utilities.

During the fiscal year ended June 30, 1929, there were added to our lines 6,894 consumers and 78,478 hp. in light and power. Through the promotional efforts of the Bureau there was added more than 1,100 kw. in illumination. There also was added 811 kw. in industrial heating of all kinds.

1. During the year 1929 400 electric ranges were added to the system.
2. 125 electric water heaters were added during 1929.
3. 15,000 electric refrigerators were added in 1920. During the past year the Bureau of Power and Light conducted a general campaign advertising the electric refrigerator. This was carried on in co-operation with distributors and dealers of electric refrigerators.
4. The average domestic consumption of electricity for 1927, 1928 and 1929 is respectively 398 kw.-hr., 443 kw.-hr., and 478 kw.-hr.

▲

"Farm Water Heater Was Developed Here"

By L. W. Brainard

Sales Manager, Idaho Power Company

IN THE territory served by the Idaho Power Company domestic service offers the best field for increased business. Therefore the efforts of this company were devoted during 1929, as in years prior, chiefly to securing increases in this class of business. Electric ranges and water heating installation sales were the principal features as set up in the commercial program at the first of the year. This program was closely followed and completed with few exceptions.

The following tabulation gives the quotas set for the year and the results accomplished:

	1929 Quota	1929 Sales
Ranges	3,250	3,327
Water heating installations	1,000	2,224
Vacuum cleaners	450	540
Washing machines	800	2,050
Motors	250	1,075
Ironers	500	280
Refrigerators	750	844
Mazda lamps*	$ 35,000	$34,054.32
Total merchandise sales	$900,000	$1,076,376.85

Average merchandise sales per residence customer, $37.23.

* Estimated total to reach quota of $1 per lighting customer.

An extensive rural electrification program was also planned and carried out, quotas set up and accomplishments being as follows:

Item	1929 Quota	1929 Accom.
Miles of new rural distribution line	346	451.61
New rural customers to be secured	1,471	2,073

The addition of these miles and customers brought our total miles of rural distribu-

tion line up to 1,761.34 miles, over which is being served a total of 9,999 (December, 1929, estimated) customers.

Promotional or combination domestic rates were adopted and made optional with residence customers in 1927. A quota was set up for 1929 of the number of residence customers receiving service under separate meter rates to whose advantage it would be to change over to combination rates plus new customers coming on lines under these rates. A similar activity was carried on during 1928 and part of 1927. The following results were accomplished:

Total residential customers Dec. 31, 1928	28,096
Combination rate customers as of Dec. 31, 1928	4,927
1929 bogey	2,854
1929 accomplishment	3,455
Combination rate customers Dec. 31, 1929	8,382
Total residential customers Dec. 31, 1929	30,604

In view of the above activities planned it was estimated that domestic kilowatt-hour sales should be increased an average of 38 kw.-hr. per average residence customer, including new customers to be secured. This quota was exceeded as follows:

Average residential customers, 1928	26,463
Average kw.-hr. per average residential customer, 1928	1,162
Average residential customers, 1929	28,909
1929 quota average kw.-hr. sales per average residential customer	1,200
Average kw.-hr. sales per average residential customer, 1929	1,252

The sale of 3,327 electric ranges resulted in increasing the percentage of residence customers using electric cooking from 36 per cent in September, 1928, to 42 per cent, September, 1929.

Electric water heating saturation was increased from 13 to 14 per cent. Many new water heating installations were sold to customers already using this service but with unsatisfactory results because of improper installation.

There are included in the number of water heating installations for 1929 474 farm water heaters. A no-pressure farm water heater was developed and manufactured locally for use in rural districts where pressure water supply is not available. These heaters filled a much felt need and gave excellent satisfaction. A description of this equipment will appear in ELECTRICAL WEST in an early issue.

In addition to our own merchandising operations during 1929 assistance and encouragement were given to all dealers in the territory. The rural service department gave particular attention to dealers handling electrically operated farm equipment. A report of this department makes available the following tabulation which shows a partial report of electrically operated equipment sold to rural customers by dealers. It is estimated that the following figures reflect approximately 80 per cent of the total sales to rural customers of the items listed.

Items	Sold During 1929
Water systems	422
Milking machines	129
Irrigation pumps	37
Separators	136
Brooders	104
Ranges	104
Refrigerators	28
Feed grinders	6
Radios	196
Motors: Number	133
Horsepower	214
Washing machines	108

In addition to maintaining good dealer relations as indicated by the above tabulation, the rural service department kept in constant contact with rural customers, assisting them in the application of electricity to their farming operations, and were responsible for a large portion of the merchandise sales shown in the first tabulation.

1930 ACTIVITIES OUTLINED

Our 1930 commercial activities as outlined will be along much the same line as our 1929 program, effort being devoted chiefly to certain commercial activities to increase the sale of kilowatt-hours as follows:

1. Gaining new customers with special attention to those on existing lines who are not now served.
2. Sales of electric ranges and water heating installations.
3. Rural service.

Other activities having an important bearing on the sale of increased kilowatt-hours to which considerable attention will also be given are:

1. Increased commercial and advertising lighting.
2. Increased commercial cooking and heating.
3. Increased power load.

Quotas are set up for 1930 as follows:

Merchandise Sales	1930 Bogey	Est. Gross Sales 1930
Ranges (power company and dealers)	3,565	$ 371,280
Water heating installations exclusive of farm water heaters	1,750	52,500
Farm water heaters	600	18,000
Refrigerators	1,200	286,000
Motors	1,000	47,000
Ironers	300	19,500
Washers	1,200	108,000
Vacuum cleaners	500	20,000
Mazda lamp sales		35,000
Miscl. appliances and supplies		142,720
Total		$1,100,000

It will be noted that the 1930 range quota of 3,565 as shown in the above tabulation is prefixed by the statement, "power company and dealers." In line with the idea of assisting dealers, this quota has been set on the estimated sales to be made by the Idaho Power Company plus those to be made by the dealers, and credit will be given to towns and divisions in our organization on their year's quota for all ranges sold by the dealers as well as by the company.

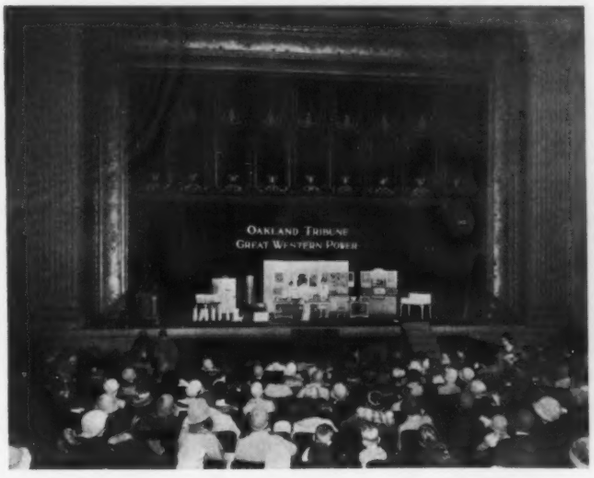
This arrangement was worked out with the thought of creating the best possible relations between the employees of our own organization and the dealers in their respective territories. The range quota of 3,565 is estimated to bring our cooking saturation from the present 42 per cent up to 50 per cent average for the system.

The following figures summarize quotas and accomplishments:

Rural Electrification 1930 Quota— 200 miles of new distribution line, 892 new rural customers.

Combination Rate Customers 1930 Quota— 3,418 to be secured in addition to 8,382 as of Dec. 31, 1928.

Left: an eminently successful cooking school. Below: The office of the California Oregon and the Mountain States Power Companies at Medford, plus a live dealer, equals a great white way



Domestic Kw.-Hr. Sales 1930 Quota– Average per residence customer, 1,350.

RANGES, WATER HEATERS AND REFRIGERATORS

In 1929 the number of electric cooking customers was increased by 2,509.

In 1930 the sales quota is set at 3,565.

Water heater customers in 1929 were increased by 467. In 1930 the sales quota is set at 2,350 water heating installations.

Information concerning refrigerators is available only from the Idaho Power Company sales, which were 844 in 1929. In 1930 the quota is 1,200.

KW.-HR. PER DOMESTIC CONSUMER

The figure of 1,220 kw.-hr. per residential consumer given in our report last year was estimated, as I remember. The actual figures available for 1928 and 1929 are as follows: 1928—1,162 kw.-hr. 1929—1,252 kw.-hr.

These figures were computed as follows: Average number of residential customers equals the total residential customers at the end of each month, divided by twelve. The total kw.-hr. sales divided by this figure for the average number of residential consumers equals the average kw.-hr. per average residential consumer.

A comparison of this figure is not made with years prior to 1928 inasmuch as rate revisions, particularly that of the water heating rate, have made comparisions on this basis of little meaning.

▲

"Present Consumers Have Increased Their Use"

By J. C. PLANKINTON

Sales Manager, Northwestern Electric Company, Portland

WHILE our new accounts have not increased as much as last year, present established consumers have increased their use of electricity sufficiently to give us a normal increase in consumption for the year.

1. The approximate number of ranges added to our system in 1929 was 1,376. Quota for 1930 is 1,800.

2. Approximate number of water heaters added to our system in 1929 was 200. Quota for 1930 is 500.

3. We have no figures on the total activities of all dealers in this territory on electric refrigerators. Our own sales amounted to 160 for 1929 and we are setting a quota of 250 for 1930.

4. The figures given for kilowatt-hours average per residential consumer in ELECTRACAL WEST for Feb. 1, 1929, are correct, excepting for 1927, which should have been 938 instead of 946. The following tabulation will give this information for 1929 together with total number of consumers, the average kilowatt-hour consumption and the average yearly revenue for our system divided into districts.

NEW
SPEED
PROGRESS ZOOMS INTO THE KITCHEN
NOW...FASTER
ELECTRIC COOKING
Fast as Hotpoint electric ranges are today, modern engineering progress has given them additional speed. The new Hi-Speed Calrod unit is the fastest electric heating unit ever conceived and steps up speed about 29 per cent!
Every housewife may now enjoy the benefits of this notable improvement, for we are making the easiest possible terms on the latest model Hotpoint electric range which is equipped with this remarkable unit. Come in, see it today! Enjoy cool, clean and faster cooking....cook with electricity!
only $1. down
ASK ABOUT OUR NEW BUYING PLAN!
NORTHWESTERN
ELECTRIC COMPANY
Light Power Heat
MODERN ELECTRICAL APPLIANCES FOR THE MODERN HOME

One of this company's most spectacular range campaigns was tied to the idea of speed as exemplified by the Zeppelin 'round-the-world flight and the new types of fast surface units on ranges

District	Residential: Number of Consumers	Residential: Kw.-Hr. Average Per Consumer Per Year	Residential: Annual Revenue Average Per Consumer	Remarks
Portland	17,220	1,242	36.10	Metropolitan district.
Vancouver	5,410	748	26.50	Six towns and rural.
Rainier	602	410	20.20	One town and rural.
All branches	23,232	1,103	33.66	

Parade of washers and ironers for the fall washer and ironer campaign of Pacific Power & Light at Lewiston, Idaho. This company sold 2,691 washers and 709 ironers last year

Business conditions in our line in this territory have been rather quiet for the past year. We have hopes, however, that 1930 will be somewhat better than 1929. Building activity has been low but there are some very good prospects for increased activity along this line for the coming year.

▲

"924 Kw.-Hr. Average Per Domestic Consumer"

By A. C. MCMICKEN

General Sales Manager, Portland Electric Power Company

WE ADDED approximately 1,350 ranges to our lines in 1929 and have plans to sell 2,000 in 1930. We added approximately 1,028 water heaters and expect to add approximately 1,200 in 1930.

I am unable to give you any figures worth consideration on the sale of electric refrigerators in our territory during the past year. Our company made very little effort along this line, leaving the job primarily to the distributors, who have large selling organizations. Our own company sold only 205 domestic installations. Our plans for 1930 are incomplete. We have not yet definitely decided whether we will actively push refrigeration, but we have established a quota of 480 domestic installations should we decide to go after this load.

We wish to correct the former figure for average domestic consumption. The 1927 figure should have been 760 kw.-hr. per residential customer. The 1928 figure of 825 kw.-hr. was an estimate. The correct figure is 853 for 1928.

Although our December meter readings are not all in, we believe that 1929 will show approximately 924 kw.-hr. average per domestic customer for the entire system.

▲

"Expect to Work Harder on Ranges and Water Heaters"

By V. H. MOON

Merchandise Manager, Pacific Power & Light Company

OUR total merchandise sales for 1929 amounted to $1,070,000, with an average number of customers served of 43,816, or $24.42 per customer.

We sold during 1929 1,195 ranges; quota for 1930, 2,000 ranges.

Six hundred and thirty-nine water heaters were sold in 1929; quota for 1930, 1,500.

Eight hundred and ninety-nine refrigerators were sold in 1929; our quota for 1930 is 1,100.

The domestic consumption figures on our system are as follows:

1926	531
1927	687
1928	964
1929	994

Our 1929 sales are comprised of the following items, with December sales estimated where actual figures are not at hand:

Space heaters (estimated)	710
Irons	1,789
Ironing machines	709
Percolators (estimated)	1,254
Ranges	1,195
Refrigerators	899
Toasters (estimated)	700
Vacuum cleaners	572
Water heaters	639
Washing machines	2,691
Waffle irons	2,524
Radios	1,038

Several other miscellaneous items are not included.

The total annual revenue, conservatively estimated, from 1929 merchandis is $141,830. It may be said that our merchandising has been conducted at a profit any way you figure it. We will show, according to our bookkeeping system, which is supposed to be correct, a net profit on $1,070,000 gross sales of approximately $80,000. Naturally the system of accounting used has much to do with the net shown, but were all charges, originating in the department, charged against it we would still show a net profit.

Plans for 1930

Using the same figure for the number of customers, our merchandise quota for 1930 will be $1,250,000, or approximately $28.50 per customer. Merchandise comprising our 1930 quota should add $180,680 to our annual revenue.

By a comparison of our 1929 sales and our 1930 quotas, it will be evident that we expect to work harder than ever on ranges and water heaters. Figures making up our quota for 1930 are shown in the tabulation below, which gives, also, the number of kilowatt-hours we estimate each device will use and the rate at which these kilowatt-hours will be purchased by our customers, also the total annual revenue which the devices should bring us when in service an entire year:

1930 Merchandise Quotas

Item	Unit Price	Total
1,100 refrigerators	$296.00	$ 325,600
2,000 ranges	182.00	364,000
2,000 washers	105.00	210,000
1,000 radios	130.50	130,500
1,000 ironers	68.00	68,000
800 vacuum cleaners	40.00	32,000
1,500 water heaters	11.00	16,500
120,000 Mazda lamps	.25	30,000
400 Telechrons	27.00	10,800
1,800 waffle irons	8.00	14,400
1,200 percolators	9.00	10,800
800 cookers	9.00	7,200
1,800 flatirons	6.00	10,800
800 toasters	8.50	6,800
920 space heaters	5.00	4,600
1,000 corn poppers	3.00	3,000
500 hotplates	10.00	5,000
		$1,250,000

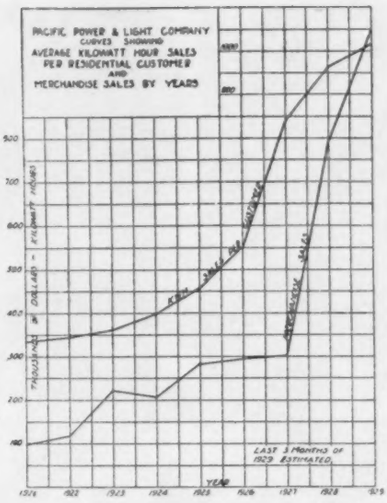


Chart showing the effect of merchandise sales on kw.-hr. sales per customer. Use of electricity has increased three-fold since 1922

While we have made some good records during the year in certain campaigns, our whole program is being built around getting the proper yearly quota of each appliance and attempting to balance the appliances and quotas in such a manner as to build the greatest amount of revenue at the lowest possible cost. In other words, as you know, some devices, which give us low annual revenue give us the highest net profit, while others, giving us a low net profit on the sale give us a high annual revenue. We have attempted to balance these two types of devices together so that we will come out at the end of the year with a good increase in revenue and an actual net profit.

"Will Equal 1929 Increases and May Exceed Them"

By H. J. Gille

General Sales Manager, Puget Sound Power & Light Company

WE HAVE carried out our development program, we think, with gratifying results.

For 1930 we have set a bogey of 7,500 ranges, 2,000 water heaters and 3,200 refrigerators, to be sold by all dealers and ourselves. Besides, we expect to have two washing machine and ironer campaigns. We had only one washing machine and ironer campaign during 1929, but the excellent results produced were such that we believe we can put on two successful campaigns in 1930, in addition to the range campaigns.

Our plans for development in 1930 are divided, broadly, into four groups:

Industrial power
Commercial light and power
Electric service in the home
Electric service on the farm.

We have every reason to believe that in 1930 the increase in business will be equal to the increase in 1929, and may even exceed it.

In the following will be found a summary of commercial activities during the past year based on figures available for the first eleven months of 1929 and quotas for 1930

Quota	Item	Estimated Annual Kw. Consump.	Total	Rate per Kw.-Hr.	Estimated Total Annual Revenue
1,100	refrigerators	500	550,000	0.04	$ 22,000
2,000	ranges	1,500	3,000,000	0.03	90,000
2,000	washers	24	48,000	0.05	2,400
1,000	radios	150	150,000	0.05	7,500
1,000	ironers	125	125,000	0.05	6,250
800	vacuum cleaners	30	24,000	0.05	1,200
1,500	water heaters	3,600	5,400,000	0.005	27,000
1,800	waffle irons	23	41,400	0.05	2,070
1,200	percolators	50	60,000	0.05	3,000
800	cookers	111	88,800	0.05	4,440
1,800	flatirons	72	129,600	0.05	6,480
800	toasters	50	40,000	0.05	2,000
920	space heaters	40	36,800	0.05	1,840
500	hotplates	200	100,000	0.04	4,000
400	Telechrons				
120,000	Mazda lamps				
1,000	corn poppers	10	10,000	0.05	500
			9,803,600		$180,680

Warmed drinking water means an average of twelve more eggs per hen during the winter.

PUGET SOUND
Power & Light Company
"ELECTRICITY IS CHEAP"

A new use developed and advertised — warming element for water in chicken houses during winter months

1. Electric ranges added to our lines, 1929 6,600
   (Number sold 7,000.)
   Range quota for 1930 7,500
2. Water heaters added to our lines, 1929 1,850
   Quota for 1930 2,000
3. Refrigerators added to our lines (all dealers) 3,000
   Refrigerators sold by us 600
   Estimated sales, all dealers, 1930 3,200
4. Consumption per domestic customer—
   1929 ..... 926 kw.-hr.
   1928 ..... 846 kw.-hr.
   1927 ..... 763 kw.-hr.
   1926 ..... 650 kw.-hr.

Rural Lines

Miles added during 1929		436
Customers added: New lines	2,885	
Customers added: Old lines	3,000	
		5,885
Total mileage Nov. 30, 1929		4,134
Total rural customers		52,110

Sales schools are part of the P. G. and E. technique. The lighting sales crew is shown above being prepared by Frank Bevan for the fall domestic lighting drive

A model job of lighting in the industrial exhibit showroom of the P. G. and E. in San Francisco serves to sell lighting for industrial plants

FARM SERVICE

No. of farms served (U.S. classification)	19,200
Kw.-hr. per farm (ex. irrigation)	995
Kw.-hr. per farm (incl. irrigation)	1,567
Ave. rate per kw.-hr. (ex. irrigation)	.0419
Ave. rate per kw.-hr. (incl. irrigation)	.0328

RATE REDUCTIONS

New domestic combination rate, effective Jan. 1, 1929.

General reduction lighting rates, effective Feb. 1, 1929.

Reduction industrial power rates, effective Sept. 1, 1929.

New commercial cooking rates, effective Oct. 5, 1929.

Another general reduction in lighting rates will be made, effective March 1, 1930.

NUMBER OF ELECTRIC CUSTOMERS

All classes, Nov. 30, 1929	141,350
All classes, Nov. 30, 1928	132,568
Increase, 6.6 per cent	8,782

SALES CAMPAIGNS

Spring range sale (April 1 to June 30)—	
Quota	2,040
Sold	2,369
Per cent of quota	116.1
Fall range sale (Sept. 1 to Nov. 30)—	
Quota	1,534
Sold	1,822
Per cent of quota	118.7
Thor washer and ironer sale (Aug. 1 to Sept. 15)—	
Quota	401
Sold	765
Per cent of quota	190.7
Preferred stock campaign (Oct. 14 to Nov. 9)—	
Number of sales	3,624
Shares sold	12,000
New stockholders	2,700

Note: The market break occurred during this period. Nevertheless, quotations on our stock on the Seattle and New York boards remained practically at 100.

LOAD

Maximum system load, 1929 (kw.)	190,000
Maximum system load, 1928 (kw.)	168,000

NEW BUSINESS

Outstanding load signed in 1929—	
Puget Sound Pulp & Timber Co. (kw.)	8,500
Fisher Body Corporation (kw.)	3,000
Bon Marche Dept. Store (kw.)	1,600

FARM ELECTRIFICATION RESEARCH

New apparatus developed and placed on the market: Electric incinerator for dead chicks and poultry. Electric heating vat for making cottage cheese.

Apparatus developed and marketed on which improvement work is in progress: Electric heaters for warming drinking water for chicks, poultry and cattle. Electric hotbed or propagating frame. Adaptation of vacuum cleaners to burning stumps.

Projects on 1930 program: Continuation of above work and electric heating of soil for maturing early crops.

"Sales Department Show Inaugurates Plans"

By H. M. CRAWFORD

General Sales Manager, Pacific Gas and Electric Company.

FOR the last two years we have been working under a new plan. Matters are so arranged that we can review the past year's achievements and set our feet upon the projects of the new year just as it is beginning. It has been a source of satisfaction to be able to do this. Plans and programs for the new year do not drag on into January and February as they once used to do. The accumulation of data on the past year's work does not have to wait either. January with us now starts off with a bang, everyone knowing what is expected of him and no excuses. It is a plan that I would commend to anyone.

In order to make the review an event of real importance we stage at that time our annual sales show. This year it was a full-day affair held on Dec. 20. All salesmen and managers were called in to San Francisco for the day. The program began early, closed on time, and wound up with an entertainment and banquet at which the 1930 plans and quotas were announced and authorized by the president of the company, A. F. Hockenbeamer, and the vice-president in charge of public relations and sales, R. E. Fisher.

As a report on that convention show was printed in the Jan. 1 issue of ELECTRICAL WEST, p. 39, suffice it here to review some of the figures concerning our past year's activities and our quotas for this year as they were presented at that meeting, augmenting these with a few more details as to outstanding loads signed and other significant data.

Our program for 1930 involves a total of $1,138,000 estimated sales cost, of which $614,000 is to be expended in the development of electric load which it is hoped will exceed 236,889 kw. connected. Estimated annual gross revenue resulting from these sales activities is expected to exceed $6,530,000, or $5.75 per dollar expended. Of a total sales force of 386 men, not including supervisors and managers, 190 men will be employed on electric sales.

Of this electric campaign $203,570 will be expended in the development of electric range, heating, and commercial, industrial and street lighting business, employing 110 men. On industrial heating and power, line extensions and agricultural business 24 men will be in the field, and $144,320 will be used in expanding this load.

Merchandise quotas are set as follows: Ranges, 3,000; water heaters, 1,450; major air heaters, 1,000; auxiliary air heaters, 10,000; floor lamps, 3,000. These are expected to yield an annual revenue of $361,000, from a connected load of 44,080 kw. The company budget sets down an equal amount of load as its estimate of dealer sales in its territory during the year, thus setting the load quota at 88,160 kw. in appliances for 1930.

R. T. Stephens, our manager of electric sales, reviewed 1929 sales accomplishments at the morning meeting. Business buildings signed last year, he showed, resulted in 133,500 kw., or 58 per cent more than quota, leading the list on last year's program.

New extensions brought 77,500 kw. of new load, or 72 per cent over quota. Electric appliance sales, including commercial cooking and heating, brought 42,500 kw., or 76 per cent of quota. In this were included 5,144 ranges, of which 2,572 were sold by dealers; 2,430 water heaters, 1,215 of which dealers sold; 1,730 large air heaters, 865 of which dealers sold, and 28,000 auxiliary air heaters, 14,000 of which dealers sold. This represents merchandise value in excess of $880,000.

Street lighting brought 2,100 kw. of new load, or 28 per cent over quota. Commercial and industrial lighting resulted in 3,200 kw., or 83 per cent of quota. Industrial power added 66 per cent over quota with a new load of 9,750 kw. Industrial electric heating

additions equaled 4,480 kw., or 89.6 per cent of quota.

In domestic lighting, an activity being pioneered by this company, 2,860 kw. in new load was signed for an estimated annual revenue of $71,500. This was 71 per cent of quota, which, when it is considered that it involved 13,500 transactions and represented $138,000 worth of merchandise sold, averaged $10 per transaction.

Mr. Stephens summed up with these figures: A total of $6,048,500 in new business signed, or 115 per cent of quota; instead of $5.25 in signed revenue per dollar spent there was $6.05 signed. Of this total business dealers were estimated to have done $1,100,000. The total electric revenue was estimated at $3,901,000.

Other features of the sales convention included an analysis of the market possibilities of the territory served by the company presented by W. P. Bear; a description of the 1930 advertising program, which involves the expenditure of $200,000, by J. Charles Jordan, advertising manager; and an analysis of 1930 possibilities for loading existing facilities, by E. F. Perkins.

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"Only Revenue Building Appliances Sold"

By G. B. Buck

General Commercial Manager, Public Service Company of Colorado

DURING the year 1929 the entire operation of the Public Service Company of Colorado was placed on a straight revenue-producing basis. Only those appliances worthy of consideration from a revenue building standpoint were sold through our efforts and the result from this change was decidedly satisfactory. Several very spectacular campaigns were conducted during the year 1929, one of which was an employee tie-in on electric iron sales. This campaign produced for us some 1,500 sales during the 30-day period, and was very influential in bringing home to our employees, regardless of department, the essentials of commercial operations, in connection with load-building.

Another campaign of particular importance was our third regular anniversary sale. This campaign, for one day only, netted us gross production of $67,500. On the first anniversary sale the gross production was $16,000. On the second sale it was $51,000, and this year $67,500.

During the past year we have opened, under the supervision of a specialist and expert, a rural service department. This department is contacting our rural customers with a view to developing electricity on the farm. Particular attention is being given to irrigation and pumping, feed preparation, and labor-saving devices in the home. We are meeting with wonderful success in this activity, and feel that our operation to date has been highly satisfactory.

During the past year we have established for our entire system a street lighting and municipal lighting department. Under the jurisdiction of this department we are handling airport development and lighting, which has shown such wonderful progress in the last twelve months. Through this department we have improved our street lighting situation in our territory by the equivalent of the past five or six years operation. We feel very gratified at the results this department has been able to attain.

Generally speaking, throughout our territory mining is predominant as the big load sector. Our power division reports an increase of more than 20,000 hp. for its year's work. The commercial, industrial and sign programs have had our constant attention during the year 1929 with the result that these types of load have shown a marked improvement.

One more agricultural advertisement showing chicken house electrification possibilities and advantages, directed by J. C. Scott, agriculturist for this company

1. The estimated number of electric ranges added to our system in 1929 was 570 and the quota established for 1930 is 800, overall.

2. The estimated number of water heaters added to our lines in 1929 was 32, and the quota for 1930 is 100.

3. Estimated figures for refrigerator sales during 1929 are: 1,426 domestic refrigerators and 77 commercial refrigerators; the quota total for 1930 is 1,700 refrigerators.

4. Figures for average domestic consumption for our system are as follows:

1929*	1928	1927	1926
385.6	352.5	332.9	.....

* November estimated.

With regard to the 1930 budget, we are contemplating the largest increases in sales and in revenue yet reported by this company. We expect to sell and install 1,000 electric ranges next year, 250 water heaters, at least 3,000 refrigerators (from all sources), 200 electric signs, 1,500 all-electric radios, to say nothing of quantities in connection with hollow-ware, cleaners, washers, and other appliances.

We feel that 1930 will be an outstanding year in this company's operations.

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"Merchandising Started in April Last Year"

By R. L. Sewell

Merchandising Manager, Salt River Valley Water Users' Association

AS YOU know, our merchandising department was organized and put in operation the 17th day of April, 1929, and before this date records in regard to ranges were the only thing kept.

On Jan. 1, 1929, we had 1,088 customers with 221,261 kw.-hr. consumption. Of this number there were 271 ranges in use.

At present we have on our lines 3,040 customers with a consumption of 386,994 kw.-hr. for the month of December, and 768 ranges installed.

I have not in this report used the N.E.L.A. kw.-hr. contest system, but for the year of 1929 we had an average of 2,113 customers, with a total consumption of 2,733,635 kw.-hr., which gives us an average of 1,241 kw.-hr. used per customer.

During our eight and one-half months' operation we have sold 217 ranges in our merchandising department. During 1930 we hope to sell 250.

During 1929 we sold 49 water heaters. We hope to sell 100 during the year 1930.

During 1929 we sold 51 refrigerators, and hope to sell not less than 75 in 1930.

I believe that the ranges put on our lines during 1929 have exceeded the record of any other company in this section of the country. At present we have 768 ranges of which 279 were placed on the lines by all other companies.

For 1926 we had an average of 446 customers with 595,982 kw.-hr. consumption, giving an average of 1,336 kw.-hr. per year.

For 1927 we had an average of 706 customers with 1,130,184 kw.-hr. consumption, an average of 1,613 kw.-hr. per connected customer per year.

During 1928 we had an average of 897 customers, with 1,716,440 kw.-hr. consumption, giving an average of 1,913 kw.-hr. per customer per year.

Editor's Note: The figures given herein probably represent power load as well as domestic load and therefore do not present only the domestic consumption. However, the domestic use of electricity on this system is high. It will be noted also that increase of territory and large additions to customers last year brings down the average consumption for this year. This, however, is a condition which 1930 should see corrected.

"1,000 Kw.-Hr. Per Domestic Consumer in 1930"

By E. G. STAHL

Sales Manager, San Joaquin Light & Power Corporation

IN THE tabulation below will be found our 1929 bogey, business connected during 1929, and the bogey for 1930.

Beginning the first of last year, all reports were made on the basis of business actually connected, rather than signed, as had been our previous custom.

SAN JOAQUIN LIGHT & POWER CORPORATION AND MIDLAND COUNTIES PUBLIC SERVICE CORPORATION

	Bogey 1929 in Kw.	Business Connected 1929 in Kw.	Bogey 1930 in Kw.
Lighting	5,960.00	6,215.20	10,130.00
Domestic and commercial combination heating and cooking service	20,242.00	27,286.47	27,545.00
General power—industrial and oil field power	10,670.00	23,157.96	18,665.00
Agricultural power	14,825.00	23,337.12	23,660.00
Total kw.	51,697.00	79,996.75	80,000.00

We have planned to conduct continuous sales effort throughout the year, concentrating on seasonal equipment in accordance with the enclosed chart. Direct mail, newspaper, magazine and other forms of advertising are to be synchronized with seasonal sales activity, and, as in the past, close contact will be maintained with equipment manufacturers and distributors, wiremen and electric service organizations.

You will note, from the foregoing, that we had an unusual year during 1929. Several conditions contributed to this result, among which are the opening of the new Kettleman oil field, general improvement in agricultural and industrial conditions throughout our territory, and several well planned sales drives.

AGRICULTURAL

In the agricultural division we exceeded our bogey by about 8,500 kw.; 7,466.5 hp. was for replacing gas engines. A very interesting fact is that since 1924 we have replaced a total of 4,155 gas engines, totaling 42,209 electric hp. installed.

Our pump testing department has prepared a series of maps showing a change in water levels in the agricultural districts throughout a period of years. This information has been of material assistance in building up our agricultural load.

A campaign on electric sterilizers during February and March of last year netted us a total of 531 sterilizers, totaling about 2,700 kw. at the end of the year. We believe the sterilizer is a proper first step in dairy electrification, and along with this load we have secured a comparable amount of milking machines, feed grinders, ensilage cutters and dairy refrigeration plants. We plan to intensify our efforts on dairy equipment throughout 1930.

HEATING

During 1929 George Zelhart was taken into the department and placed in charge of the promotion of electric heating. We have programmed a drive during the months of January, February, March, April, May, October and November, which we expect to produce 6,250 kw. in this class of load, divided as follows:

4,000 kw. in air heating
1,000 kw. in commercial cooking and baking.
1,250 kw. in industrial heating

6,250 kw.

This load is exclusive of pipe line oil heating, electric ranges, water heaters and sterilizers.

LIGHTING

Results were very satisfactory in industrial lighting during the year. We have planned three direct-mail campaigns for 1930, which will be followed up with personal contact.

There was considerable activity throughout 1929 in the lighting of athletic fields and airports, and the Christmas tree lighting program went over successfully. We are proposing to follow this up carefully throughout this year.

Floodlighted in color, with twenty lighted Christmas trees along the marquee and in niches at the third and eighth floors, the San Joaquin Power Building in Fresno was a Christmas tree in itself

OIL FIELD POWER

A check of oil field new business connected during the year 1929 shows a gain of 16,207 hp. This figure represents power load as follows:

General power service (including drilling, compressor operation, pipe line pumping, water wells and other general utility equipment)	12,670 hp.
Oil-well pumping	2,457 hp.
Wholesale power	1,080 hp.

Activity in Kettleman Hills area was responsible for 4,600 hp. in drilling motor load, 1,400 hp. in water well pumping, 500 hp. in lighting, compressors, line pumps and miscellaneous power service—a total of 6,500 hp.

Our program for the year 1930 includes sales activity in pipe line pumping and auxiliary line heating. All of the major oil company pipe lines carrying oils from the San Joaquin Valley fields traverse our territory. The discovery of lighter oil in Kettleman Hills will allow for mixing of this oil with heavier oils from other valley fields, which we believe will offer opportunity for oil operators to take advantage of electric pumping.

Electric heating experiments for heating heavy gravity oil while in transit through pile lines are being demonstrated at present.

During continued cold weather throughout the winter months the loss from initial heating by conduction through cold, wet ground, is so great, and cooling of oil so rapid, that the flow of oil is often reduced to a very small percentage of the normal, if not entirely stopped by a succession of cold slugs. It is this particular condition that we hope to eliminate by the application of electric heaters, thereby increasing the temperature of oil by several degrees.

We will continue activity in the replacement of steam and gas engine oil-well pumping equipment with electric motor operation.

Mr. Courtright is preparing a report for the Valley Electric Supply Company's sales program for 1930. He will show the number of heavy duty and small appliances they propose to connect during the year.

Our bogey for 1930 is 1,000 kw.-hr. per domestic consumer, which will require an increase of probably 140 kw.-hr. per consumer over 1929.

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"24.55 Per Cent Increase Over 1928 Sales"

By H. H. COURTRIGHT

President and Manager, Valley Electrical Supply Company, Fresno

DURING the year 1929 just ended the Valley Electrical Supply Company, merchandising division of the San Joaquin Light & Power Corporation, has again devoted most of its energies to increasing the domestic load on the parent company's lines. The results of our efforts have been as follows:

HEAVY DUTY APPLIANCES

	1929 Budget	1929 Sales
Ranges	1,450	1,828
Water heaters	945	1,232
Large air heaters	430	880
Misc. appliances	425	291
Total appliances	3,250	4,231
Kw. connected load	16,500	23,709

This kilowatt volume represents an increase of 4,673 kw., or 24.55 per cent over our 1928 sales, and of 7,209 kw.,

or 43.69 per cent over the budget set for the year 1929.

The estimated revenue to the power company on the 1929 addition is $296,362 during the first year. This does not include commercial and industrial air heating equipment, sterilizers and large individual commercial bake ovens.

The majority of all heavy duty appliances have again been sold through our co-operating dealers in line with our established "through-the-dealer" sales policy.

During 1929 we conducted four special sales of domestic heavy duty equipment, one of these for the special convenience of power company employees. The results of those sales are included in the totals set down above.

Small Appliances

The sales of small convenience outlet appliances totaled 13,231 pieces. A number of these were sold through our co-operating dealers in special, stimulating sales. These small appliances represented a connected load of 6,003.5 kw., which is estimated to bring to the utility an additional revenue of $60,030.

Refrigerators

We have sold, at retail as well as at wholesale, 1,667 electric refrigerators, all but a very few of which were for domestic use. Our 1929 refrigerator bogey was set at 1,800 units. We may thus say that we have come very near to reaching our goal.

1930 Budget

Following is our sales budget for the year 1930:

Heavy-Duty Appliances:
- 1,575 ranges
- 1,040 water heaters
- 475 large air heaters
- 250 miscellaneous heay-duty appliances

3,240 total appliances with a connection value of 18,150 kw.

Small Appliances:
- 1,500 cookers
- 1,000 small air heaters
- 1,800 toasters
- 1,500 waffle irons
- 2,500 flatirons
- 1,700 percolators
- 1,000 corn poppers
- 750 fans
- 1,750 table stoves
- 750 heating pads
- 500 sweepers
- 1,200 washers
- 2,944 refrigerators
- 1,500 miscellaneous
- 400 ironers
- 300 radios

21,094 appliances. Total connected load, 9,750 kw.

Refrigerators:
- 2,650 domestic refrigerators
- 350 commercial refrigerators

3,000 units of refrigeration in all

It has been our aim for several years to raise the consumption of domestic current by 100 kw. per account per year. During the two years preceding the year 1929 we have been successful in reaching that goal. The report of Mr. Stahl, sales manager of the San Joaquin Light & Power Corporation, will show you that the desired increase has again been accomplished during the year just ended.

Note: Subsequent to this statement the final figures for the kw.-hr. consumption for the Midland Counties Public Service Corporation and the San Joaquin Light & Power Corporation were reported on by A. M. Frost, general commercial manager for both these companies and the Great Western Power Company. The average kw.-hr. per domestic consumer figures for the Midland Counties company were 1,020 kw.-hr.; for the San Joaquin company, 806 kw.-hr., giving an average for both of 835 kw.-hr. The Great Western Power Company figure was reported to be 750 kw.-hr. per residential consumer.

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The MAZDA LIGHT BRIGADE
2 Lamp Shades FREE
$1.20
An Employee
BUY NOW! OFFERS!
"Electrical Happiness Stores"
SAN DIEGO CONSOLIDATED GAS & ELECTRIC COMPANY
6 IN A CARTON
MAZDA LIGHTS will chase away the gloom, and the dark corners. They will light the way to greater comfort and convenience in your home.
There's a lamp for every light socket . . . Mazda lamps are more efficient and cost less now than ever before.
Buy a Box of "Spares" Today!
On Sale at your Nearest Electrical Dealer
"Electrical Happiness Stores"
SAN DIEGO CONSOLIDATED GAS & ELECTRIC CO.

Several large advertisements of this kind heralded the approach of the employee and dealer lamp salesmen during the lamp kit drive conducted just before Christmas

"New Rate Has Aided in Increased Sales"

By A. E. Holloway

Superintendent, Commercial Department, San Diego Consolidated Gas & Electric Company

PROGRESS of the electrical industry in San Diego County during the year 1929 was very satisfactory. At the end of the year we found an increase of approximately 2,217 electrical customers and 15,603 kw. of connected load, which is an increase of approximately 3.3 per cent in the number of customers and 13 per cent in the connected load.

In April, 1929, the company installed a special domestic schedule with very favorable minimums and advantageous rates to the domestic customer for increased usage of electric service. This new rate has been highly appreciated by customers of the company and we believe has aided materially in the increase in sales to domestic customers. Our lighting, cooking and heating load shows an increase for the year of approximately 20.8 per cent and our power load of approximately 4 per cent.

Our greatest commercial development activities during 1929 were in domestic and commercial lighting service, particular attention having been paid to the building of domestic load. Advertising campaigns covering our new rate schedules, together with house-to-house solicitation, have considerably increased the use of electric service in the home.

In the commercial field particular attention was given to each new building and store constructed during the year, with the result that greatly increased illumination with higher intensities and much added electrical equipment have been installed.

The building activities in 1929 for San Diego were about the same as the previous year, there being a total of approximately $12,000,000 expended on building construction.

Considerable increases in sign lighting load and floodlighting installations were shown throughout the year and particular attention was given to building up this type of load.

Our merchandising activities have resulted in greatly increased sales over 1928, showing a total of approximately 12,000 new electric appliance sales. Electric irons headed the list in number, there being approximately 1,500 sold. The per cent of increase in appliance sales for 1929 over 1928 amounted to 72 per cent.

A number of special campaigns were carried on, the larger ones being on electric ranges and electric water heaters. Over 200 electric cooking schools were carried on throughout our district for the demonstration of electric ranges, with very good success.

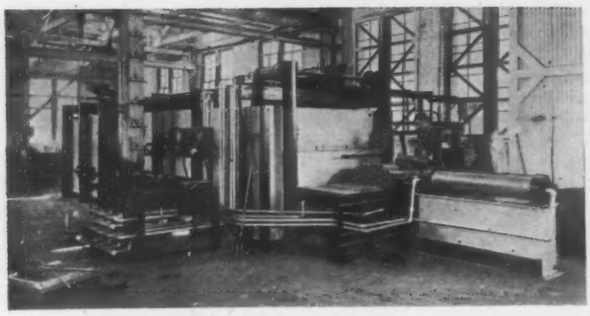
Each month a major and a minor appliance were featured by our appliance stores in a particular campaign for that month. During October we carried on a lighting bulb campaign through our employees and the electrical contractors and dealers. Our employees sold a total of 34,361 lamps and the dealers 41,735 (estimated), making a total for the company and dealers of 76,096.

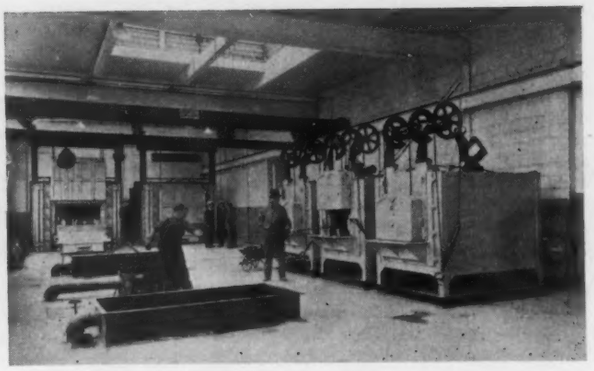
Our Red Seal activities show a total of 80 Red Seal homes completed. Probably three times this number would have equaled Red Seal specifications except for some minor detail. Our Red Seal activities showed that we reached 160 per cent of the quota assigned to us for the year.

During 1929 550 new electric ranges were added to our lines and we have set a quota for 1930 of 600 ranges. Two hundred and fifty new water heaters were added to our lines and a quota of 300 has been set for 1930.

While our figures are not accurate for refrigerator sales, we estimate that a total of 1,200 refrigerators were sold in San Diego County, and that at least 1,500 will be sold during 1930.

The average kilowatt-hour consumption per residential consumer for the year 1929 amounted to 496.3 kw. We do not have figures available for the entire previous year, but know that this was a considerable increase over the previous year.





Southern California Edison industrial heating jobs grow apace. Byron Jackson Company (right) has two 240-kw. car and three 45-kw. box furnaces. Axleson Machine Company (above) has a continuous pusher-type 120-kw. furnace for annealing

Plans for 1930 contemplate activities along about the same lines as those carried on during 1929. The major part of our commercial activity will be concentrated on the building of domestic and commercial lighting load, as well as commercial cooking and heating. In order to build the residential and commercial load we will continue our work on the Red Seal campaign with a larger quota than last year and also on the commercial Red Seal work.

Small appliance campaigns will be carried out each month in conjunction with the electrical contractors and dealers.

Our home service work will be increased so that we may come in closer contact with the women and develop new ideas for the use of electric service in the home.

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"All Our Plans Made Accordingly"

By W. L. Frost

General Commercial Manager, Southern California Edison Company

PRINCIPAL among the accomplishments of the commercial organization of the Southern California Edison Company was that of increasing the gross earnings from $35,281,927 in the year 1928 to approximately $40,500,000 in 1929.

Our budget for new horsepower to be secured during the year 1929 was 358,000 and 363,000 hp. has been secured, some of the principal components being as follows:

Lighting 68,000 hp.; industrial heating 17,000 hp.; agriculture 41,000 hp.; industrial power (meaning new installations and plants) 77,000 hp.; power for oil industries 68,000 hp.; electric cooking and heating 98,000 hp. (this item including 4,000 hp. heavy-duty kitchen equipment); 11,000 hp. for air heating (electric air heating is developing very rapidly in this territory; many buildings, churches, hospitals and larger resudences having been completely equipped with electric heating installations during the past year); 6,500 hp. water heating and some 63,000 hp. in electric ranges.

One of the major items was the result of efforts of our salesmen in persuading the owners of 850 new residences to have these wired in accordance with Red Seal specifications, this being done in co-operation with the California Electrical Bureau.

Electrical merchandise to the amount of $1,895,000 was sold by the company, including such items as: 6,250 electric ranges (our annual fall Hotpoint range campaign conducted for a period of eight weeks ending Dec. 20, accounted for a total of 2,445 electric range sales); 1,900 water heaters; 1,450 electric refrigerators and 26,000 small appliances such as percolators, toasters, and irons. Figures are not available but we estimate that some 11,000 electric refrigerators have been placed on our lines through sales made by manufacturers and dealer agencies.

Particular attention was given to increasing lighting consumption, through the efforts of fifteen lighting specialists. These co-operated with local contractor-dealers in installing new or additional lighting equipment for both old and new customers. Much was accomplished in the way of more adequate illumination in homes, stores and industries, including a large amount of flood and decorative lighting.

There were 27,000 new consumers added to our lines in 1929.

The annual kilowatt-hour consumption for domestic consumers was increased from 572 to 640.

Of special interest was the Christmas tree illumination movement, which was inaugurated and sponsored by all of the chambers of commerce and various civic organizations in Southern California cities. We co-operated as much as possible in this movement and it is safe to say that at least 25,000 outdoor Christmas trees were illuminated during the last two weeks of the year.

An interesting development undertaken by our lighting specialists has been adequate illumination of oil well derricks. Many of the major oil companies have adopted the wiring specifications made by our engineers, with the result that under these specifications night drilling and operation of oil wells has been greatly facilitated.

Plans for 1930

All of our commercial activities of 1929 will be continued in 1930, except that in every instance our sales budgets and programs will be materially increased. In spite of our recent heavy reductions we contemplate an increase in gross revenue of $4,500,000 and an increase in our present connected load of 365,000 hp., a 15 per cent increase.

Additional salesmen, supplementing present forces, will be employed in all commercial department activities. Especially is this true of lighting, heavy duty and air heating and Red Seal homes. As in the past, none of these specialists will sell through the company, electrical apparatus pertaining to their special activities, but, as in the past, they will co-operate with local electrical contractors and other dealers, assisting them in all possible ways in effecting the sale of equipment. Except for short periods during sales campaigns on special articles all merchandise will be sold at the regular retail price. On rare occasions when prices other than regular retail are quoted, dealers will be given an equal opportunity to participate.

We have established a gross sales volume for merchandise to be sold by the company itself slightly in excess of the returns for 1929. Our range quota will be 7,500, water heaters 3,000, refrigerators 1,500, Red Seal homes 1,200. Our principal objective is to increase total gross earnings, which will be $40,500,000 in 1929, to $44,750,000 in 1930. The latter figure takes into consideration the fact that we have reduced our rates recently to the extent of $2,500,000.

A departure from past policies will be that each of our merchandise salesmen will specialize on one certain article, instead of being responsible as in the past for the sale of several articles such as refrigerators, ranges and water heaters. We are decidedly of the opinion that 1930 will, in so far as the Southern California Edison Company is concerned, produce at least as good, if not better, results than 1929. All of our plans have been made accordingly.

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"Advertising Gives Better Results Than Pressure"

By O. S. Clifford

Sales Manager, Sierra Pacific Power Company, Reno, Nevada

WE HAVE just completed our sales report for the year 1929 and also have just made our bogey for our

sales department for 1930. Summarized it is as follows:

In 1929 we sold 168 electric ranges and the estimate for 1930 is 200.

In 1929 we added 61 electric water heaters and the bogey for 1930 is 100.

In 1929 we installed 232 General Electric refrigerators and the bogey for 1930 is 400.

The average domestic consumption per home meter in kw.-hr. for 1929 was 719.55. We use the system in obtaining this figure as sponsored by the N.E.L.A.

In addition to the above figures, we believe that the various specialty stores, contractors, department stores and other dealers sold an equal number of appliances.

During 1930 we propose to stress and push the sales of electric ranges, electric water heaters, electric air heaters and refrigerators. We are spending most of our effort on these appliances because they build load and build our gross sales. However, we shall not forget the small appliances and lamps. Each month we shall have a major activity and a minor activity for the sale of small appliances following a plan outlined by the N.E.L.A. and, of course, growing with the seasons.

The year 1929 was our largest year and nearly doubled our 1928 sales of electrical appliances. During the year we also added 639 new electric customers to our system. We accomplished all this by putting much effort into our sales work and by giving excellent service. It has not been necessary to put on any high-pressure campaign sales, and as a result our repossessions have amounted to nothing. Also we increased our advertising in 1929 from which we secured much better results than from a high-pressure sales force.

So 1930 promises to be an excellent year in this territory for the sale of electrical appliances, both for us and for the various electrical appliance dealers. Again this year we plan to advertise extensively, give better service than before and to follow up all sales to see that the electrical appliances are installed properly, and that the new owner understands them and knows how to operate them.

Desert Loads Increasing Slowly but Surely

for GEORGE BIGELOW

Commercial Manager, The Southern Sierras Power Company, Riverside, Calif.

INASMUCH as an article dealing with the desert developments on the lines of The Southern Sierras Power Company is under preparation for an early issue of this magazine, Mr. Bigelow merely sent in figures on quotas and kilowatt-hour sales per domestic consumer. These were contained in the following telegram:

"Estimated number of ranges added in 1929 was 550. Quota for 1930 is 800 ranges. Water heaters added in 1929 were 250. Quota for 1930 is 500 water heaters. Refrigerators added in 1929 amounted to 500. In 1930 we expect to connect 1,000.

"The average domestic kilowatt-hour consumption in 1926 was 501; in 1927 it was 560; in 1928 it was 596 and in 1929 it reached 690 kw.-hr."

Two range campaigns were conducted by this company last year, with excellent results. Two more such campaigns are in contemplation this year. Water heaters will be stressed at the same time that ranges are being campaigned.

In the past few years pumping load has increased for this company, particularly in the Coachella Valley where extensive date ranches are under development. Likewise in its affiliated Mexican company a number of pumping installations of importance have added to the load in the past year. Contrary to practically all other agricultural districts in California, the Imperial Valley has little or no pumping load, all water being supplied by gravity flow from canals. Line loading in this territory has always been a very slow process, both because of small power use and because until recently the percent of owners of ranches who resided on them themselves was small. An interesting account of the new "dude desert" which has sprung up in this territory is forthcoming. This in itself has resulted in a greatly increased domestic use of electricity.

"Now Operate Five Stores in Suburban Areas"

By J. D. ROSS

Superintendent of Lighting, City of Seattle Lighting Department

ONE suburban store was added during the past year, bringing the number of suburban stores we operate to five. These stores sell $500,000 worth of electrical appliances anuually.

The estimated number of electric ranges added in 1929 was 3,000. Our quota for 1930 is 3,000 ranges.

The estimated number of water heaters added in 1929 was 1,000. The quota for 1930 is 1,100.

The city has not sold refrigerators in the past but will add a refrigerator line in 1930. No quota is announced.

The estimated average consumption for domestic accounts is 1,023 kw.-hr. per year.

Other City Light achievements for 1929 include:

	Dec. 31, 1928	Est. Dec. 31, 1929
Total accounts	92,428	95,500
Residence acc'ts	80,540	83,000
Kilowatt-hour sales	238,635,356	295,000,000
Station peak—kw.	76,800	84,500

Some of the large loads cut in during 1929 are:

Pacific Coast Cement plant	7,500 hp.
Northern Life Tower (22-story office building)	750 kw.
Exchange Building (19-story office building)	900 kw.
Addition to County-City Building	400 kw.
King County Airport	500 kw.

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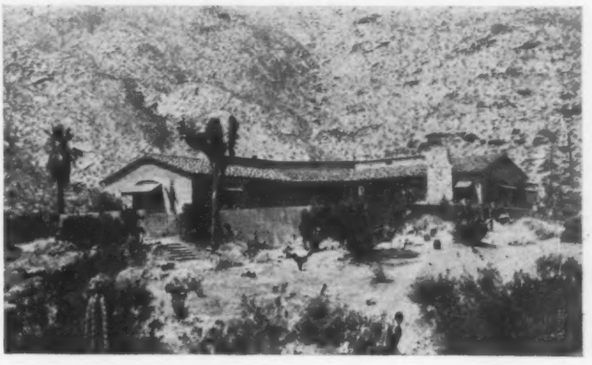
"Plan Active Co-operation With Contractors"

By CHARLES A. LUND

Superintendent of Commercial Sales, City of Tacoma, Department of Public Utilities

KILOWATT-HOUR output for our own system (exclusive of that furnished other utilities) showed an increase of 52,097,000, or a total of 248,714,000 kw.-hr., and the corresponding maximum peak was 55,000 kw. during 1929.

Dredges to pump Colorado River silt from the settling basin back into the river (below) make a big load which Southern Sierras Power Company serves. De luxe desert homes such as that of King G. Gillette, safety razor tycoon, at Palm Springs, are generous users of electricity



Two of Tacoma's most enterprising dealers are the Bob Gleason Electric Company (above) in the downtown business area and the Beckman Electric Company (right) in the better residential district. Both cooperate with the city in range campaigns and do a good appliance business.

During the year the following new equipment was connected: 784 ranges, bringing the total number to 7,219; 556 water heaters (3.5 kw. predominating); 745 refrigerators, approximately 30 per cent being commercial; and 652 kw. of commercial heavy-duty equipment. The average consumption per residential customer increased from 1,285 kw.-hr. for 1928 to 1,337 kw.-hr. for 1929. Two major range sales, in accordance with our usual practice, were held, one in the spring and one in the fall of the year.

For the coming year, we plan to concentrate on further increased use of electricity in the home by means of active co-operation with the contractor-dealers and more aggressive effort in the field. All indications seem to point to a very successful year, not only in the domestic and commercial loads, but also in the industrial.

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"Will Continue Along the Same Lines"

By LEWIS A. LEWIS

Assistant General Manager, The Washington Water Power Company

IT HAS been impossible to get the figures requested due to the dates of closing our books, and some of the statistics are not kept in the same order that they have been kept in previous years, which will throw our average consumption per customer for 1929 somewhat out of line with previous published reports. We wish, if it is possible for you to omit the consumption of previous years, you would show only the consumption for 1929, as the increase does not reflect the true increase of the kilowatt-hour consumption for 1929.

Electric ranges added in 1929	1,270
Quota for 1930	1,500
Water heaters added in 1929	1,261
Quota for 1930	1,500
Average kilowatt-hour consumption per residence customer, exclusive of water heating	759

We do not anticipate anything spectacular in our commercial activities for 1930 but will continue merchandising very much along the same line that we have in the past year.

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"1930 Will Keep us Busy Supplying Demand"

By J. A. CLAY

General Manager, The Western Colorado Power Company

DURING the year ended November, 1929, we made a net gain of 515 customers and 1,080 kw. of connected load, despite an actual offsetting loss in our mining districts of 251 customers and 2,744 kw. of connected load. The loss in customers and load in the mining districts is due to metal mines closing down in Telluride and the curtailment of mining in Rico and Ouray.

$9.75 DOWN
At a Reduced Price We Now Introduce
Full Automatic Westinghouse Console Electric Range
With An Automatic Electric Water Heater
Opportunity Days Begin Monday
Westinghouse Automatic "Clix-on" Thermostat FREE With Your New Electric Range
Grace Bogue Wilkes Will Demonstrate Clever Easy Cooking
Other New Westinghouse Models
The Washington Water Power Co.

Department store types of advertising have been used successfully by this company to build up a high range saturation and ample appliance sales

The gain in customers and load is accounted for chiefly by our entering a rich and fertile agricultural district by the extension of an 11-kv. transmission line from what was the northern end of our system at Delta, Colo., north and east to Cedaredge, traversing a rather thickly populated rural territory and serving approximately 200 customers along the route of the line in an incorporated area known as Orchard City, and 100 other customers to whom service was made available by this extension.

We purchased the steam plant and distribution system in the town of Cedaredge early in 1929, and immediately made available 24-hour service in that community. When the transmission line from Delta was completed during the summer months, the Cedaredge plant was shut down. Approximately 170 customers were added to our records in the town of Cedaredge.

In addition to these extensions adjacent to Delta, considerable rural extension work was carried on during the year just ended adjacent to Montrose, Olathe and Durango. While these extensions did not account for any large numbers of customers, nevertheless an analysis of our rural accounts shows that we had 508 in November this year as against 252 in November last year, or an increase this year of 256 rural customers. This is exclusive of customers added in Cedaredge and the area known as Orchard City.

While we lost considerable load in the Telluride-Rico district during the year, mining activity has increased in the Silverton district during the past several months to the point where we are at this date adding new loads that will offset the loss in the Telluride-Rico district. We expect to connect to existing lines in the Silverton district during the current month approximately 1,200 kw. of mining power load, and possibilities are that we will add more of this kind of load during the spring and summer months.

Following the custom of tabulating consumers and connected load on our lines this year as compared with last year, we are presenting these figures in comparable form.

Kilowatt-hour sales per customer are calculated for the month of November in 1928 and 1929 only, and not on an annual basis.

Delta-Orchard City district shows a loss in kilowatt-hour sales per customer of 1.7, but this is probably caused by our taking on so many new rural cus-

	Total Number Consumers			Total Connected Load in Kw.			Kw.-Hr. Sold Per Res'dl. Customer		
	Nov.	Nov.	%	Nov.	Nov.	%	Nov.	Nov.	%
Agricultural District	1928	1929	Gain	1928	1929	Gain	1928	1929	Gain
Delta-Orchard City	970	1,273	31.2	2,349	2,762	17.9	35.4	34.8	1.7*
Cedaredge	.....	168	100.0	.....	164	100.0	.....	24.0	100.0
Montrose-Olathe	1,491	1,643	10.2	2,854	3,066	8.4	36.4	37.0	1.6
Mining District									
Telluride-Rico	730	506	30.6*	4,445	1,793	59.5*	85.6	92.0	7.4
Silverton†	8	11	.....	3,513	3,772	7.3	.....	.....	.....
Ouray	479	449	6.2*	1,335	1,030	22.2*	63.6	60.9	4.2*
Agricultural, Mining and Smelter District									
Durango	2,305	2,448	6.2	6,254	7,098	11.7	58.1	69.7	20.0
Totals	5,983	6,498	8.6	20,750	19,685				

†We wholesale service to one customer who distributes in town of Silverton; other customers are mining power users near Silverton.
*Percent decrease.

It will be noted from the foregoing statement that we have made healthy gains in consumers and load in all our territory excepting two mining districts.

tomers in this territory who never used electricity before and who have not yet built up their monthly consumption to the level of the other customers in this district. Montrose-Olathe shows a slight gain over last year. Telluride-Rico shows a large gain over last year, but we have so many flat-rate customers in this territory whose kilowatt-hour consumption must necessarily be estimated that the figure is not absolutely correct as determined from metered consumption. A decrease is noted in Ouray, which we consider normal due to conditions there as a result of mining depression. Durango shows a healthy gain in consumption per customer, which is due to increased use of electricity for cooking and water heating.

In addition to the tabulation given above, we are setting forth below a statement showing number of customers, by classes of service, on our lines November, 1929, as compared with November, 1928. This statement does not include those users of electricity in the towns of Silverton, Mancos, Dolores and Cortez who are, indirectly, using service supplied by us.

Class of Service	Number of Customers Nov., 1928	Nov., 1929	Increase
Residence light and fuel	4,295	4,698	403
Commercial light and fuel	1,410	1,474	64
Power—all classes	259	304	45
Municipal street and building lighting	18	19	1
Public Service Corporation for resale	1	3	2
Total	5,983	6,498	515

Kilowatt-hour consumption per customer for residential lighting and fuel for November, 1928, was 52.66 and for November, 1929, 54.28. Commercial light and fuel consumption per customer for November, 1928, was 113.68 and for November, 1929, 127.28.

We estimate 75 electric ranges were added to our lines during 1929, and plan to add 150 during 1930.

Thirty-five water heaters were sold by us and added to our lines in 1929. We estimate 75 will be added during 1930.

Refrigerators sold by ourselves and others and added to our lines total approximately 40. Fifty is our quota for 1930.

The average domestic consumption for 1927 and 1928 as reported to you last year was arrived at by dividing the number of customers on lines at the end of November into kilowatt-hour consumption for the twelve months ended that month, but this method is not accurate for determining the average consumption per customer for the year. We are reporting this on a monthly basis for November, 1928 and 1929. To make a clear comparison we are setting below the average domestic consumption for each November for the last four years.

	1929	1928	1927	1926
Maximum	92	85.6	75.9	89.2
Minimum	24	35.4	30.2	28.1

In each case above the maximum consumption has been found in Telluride and the minimum in one or another of the agricultural towns.

Since the addition of our many new customers in the rural territory between Delta and Cedaredge, we have been forming a commercial department to function in that section. We plan extensive sales activity during the year 1930, having in mind the building up of this rural business through the sale of domestic and farm load building appliances. Service extensions are being made almost continuously and we are optimistic of the future growth of this newly added district.

Mining and milling of ores furnish major load to the Western Colorado Power Company. At right is shown the Shenandoah-Dives Mill, near Silverton, Colo., shortly before it was finished

Byllesby Companies' Data Received Too Late

THREE Byllesby properties, the Southern Colorado Power Company, of Pueblo, Colo., the Mountain States Power Company and the California Oregon Power Company of Medford, Ore., could not be included in this issue because of delayed reports, although every effort was made by J. W. Hicks, editor of Byllesby Publications, Chicago, to supply the information by telegram. What information there is on the commercial achievements of 1929 is contained in the tables on pp. 74 and 75. This includes the range sales, water heater sales and refrigerator sales for these companies for 1929.

Acting upon a wire from Mr. Hicks, reporting upon the Southern Colorado Power Company, figures for 1930 quotas were also listed. Likewise figures for kilowatt-hour consumption were entered in the tables just as this magazine went to press. A later telegram from Mr. Hicks asked that these figures be omitted as they were not final. Unfortunately, however, it was then too late to make the change.

ELECTRICAL WEST regrets this situation not only because of its inability to revise the late figures, but more because these Byllesby properties during the past year have made great commercial strides, the details of which are not available for recounting here so that all the industry may know of the progress.

One instance of particular importance was the consolidation of the commercial and sales activities of the Mountain States Power Company, with offices formerly at Albany, Ore., and the California Oregon Power Company, with new headquarters at the latter's offices at Medford, Ore. C. M. Brewer became vice-president and general manager for both properties. Glenn L. Jackson, formerly with the Mountain States Power Company, became sales manager for both companies. J. J. Buchter and H. L. Bromley, of the California Oregon Power Company, became, respectively, merchandise manager and advertising manager of both companies. A more detailed account of the merchandising set-up of the joint companies has been promised for a future issue.

Electrical West

G. C. Tenney, *Editor*

Power Company Competition a Stabilizer in Merchandising

THE Puget Sound Power & Light Company is getting back into the appliance merchandising business in Seattle. Beyond a mild interest in the news contained in this statement is a significance of vastly greater import than the mere fact expressed. It is understood that one of the principal reasons for the company's re-entry into this field has been the desire on the part of the other dealers in electrical appliances for the stabilizing influence of the company's activity.

A few years ago the electrical dealers of the city entered fervent protests against the kind of competition they had to meet from the merchandising departments of the municipal utility and the private company. The dealers' attack was directed primarily against the city, which, they insisted, was selling all kinds of appliances at cut rates and thus competing unfairly with its own citizens. The private company, having been made a party to the complaint, immediately agreed to cease selling any appliances in the city other than ranges, water heaters and refrigerators, leaving the municipal utility and the dealers to wage a bitter fight before the City Council.

It is interesting now to note the attitude of the dealers with respect to power company merchandising. They have seen the city flooded with cheap appliances and the entry into the business of retail outlets that they do not believe are logical outlets for electrical merchandise. They know that a number of people look to the power company for guidance in things electrical. They know the power company will handle only quality merchandise at fair prices with adequate margins of profit, merchandise that requires a minimum of servicing —in other words, that the company will engage in the cleanest and most constructive type of merchandising business. They believe, further, that the sales promotion effort put behind the appliance business by the company will enlarge existing markets and create new ones and stimulate demand generally. In short, they believe that with the company in the business there will be more business for all and that the business done will be more satisfactory to all concerned—that a stabilizing factor of considerable value will be introduced into what has recently been considered an unwholesome condition.

This point of view of the Seattle dealers is interesting when considered in comparison with another attitude frequently encountered in which the dealers resent the entry of a power company into competition with them in a line of business they consider solely their own. Which of the two lines of reasoning is the more fundamentally sound? The reasoning of Seattle dealers possesses the advantage of being the outcome of experience. Even more significant is the fact that it is concrete evidence of the increasing spirit of co-operation between dealers and power company.

Not Spendthrifts but "Pikers"

SOMETIMES a little self-analysis and introspection is good for the soul. If so, then the electrical industry may benefit from some of the testimony that is being presented before the Federal Trade Commission in rebuttal of charges of over-zealous propaganda activities.

Take, for instance, the matter of advertising. Counsel for the utilities in one of the recent hearings stated that in 1928 all power companies combined spent $8,425,320 in newspapers and magazines—a total expenditure of only 0.683 of 1 per cent of gross. For purposes of comparison a similar list of percentages was presented for other representative industries. This included: automobiles and trucks, 2.16 per cent; building materials, 5.70; food products, 8.75; furniture, 2.70; radio, 7.30; and so on down a long list. The power companies were at the bottom.

Of the money spent by the power companies 44.1 per cent was used to advertise appliances. Publicizing security issues required 5.3 per cent. The remainder represented institutional, community-development and service-building advertisements.

And yet, in the face of these illuminating figures, this is called the "commercial era" of the light and power business. Executives are demanding more revenue per dollar of investment. Commercial managers talk of merchandising and load-building, and the power company advertising manager has an appropriation at his disposal that is hardly worthy of the name when compared with advertising expenditures of other industries. The situation is summed up aptly by a noted advertising man who said recently, "When it comes to advertising, the power companies are 'pikers.'"

The Farmer's Point of View in Rural Electrification

DO THE executive heads of power companies engaged in developing rural electrification really see the problem in its true light? The usual tendency, when the subject is mentioned, is for these executives to commence to boast about how many ranges, washing machines and other conveniences their companies have placed in the farm homes in their territory. They make no reference to the number of motors or other applications they have placed in the farmer's business operations.

It appears that this attitude betrays a thorough lack of understanding of the fundamentals of the problem. Such boasts are evidence that the problem is being approached solely from the point of view of the power company looking out for its own immediate interests. The editors feel that if a real and permanent solution is ever to be found, the power company must, for a time, partially subordinate its own interests and approach rural electrification problems from the point of view of the farmer.

The farmer's viewpoint is radically different from that of the urbanite. He buys commodities and services for different reasons. He cannot be sold by the same methods and arguments that are used with his city cousin. He is primarily interested in three things, and his decision to use electricity or not to use it at the price he has to pay will be based upon the effect of electric service on these three considerations. He wants to produce the same crops at less cost; he wants to produce more crops for the same cost; or, he wants better or earlier crops, giving him a favorable price differential in the market at a cost less than the additional revenue accruing to him from the price differential gained. If electricity will accomplish any of these results, then he will buy it; if not, then he is not interested.

Now the company that insists on selling the farmer, sometimes by high-pressure methods, only those applications that are particularly favorable to the company from a load standpoint, without regard to their effect on the farmer's economic condition, is adopting a short-sighted attitude and is doing little toward hastening the kind of rural electrification that will benefit the company and the farmer alike. The company should look at the problem from the standpoint of the farmer and should promote the sale to him of only those applications that will benefit him by increasing the net revenue of his business. With this approach to the problem, the company's development of its rural business will bring increased prosperity to its farm customers, thus paving the way for the future sale to him of all sorts of loads, the final result of which will be an over-all load factor that will make the business profitable to the company.

Unless the industry generally adopts this point of view as its fundamental policy in rural electrification, and unless it speeds up the work of its agencies that are attempting by research and experimentation to find profitable uses of electricity for the farmer, veritable rural electrification in this country—the kind both the industry and the farmer would like to see—will be a long time coming.

Lessons From the Drought of 1929

SPECTACULAR use of the *U.S.S. Lexington* to augment the power supply of the City of Tacoma has focused attention upon more than the mere vagaries of the weather or the fact that a serious shortage of water existed during 1929. A lesson has been learned in reliability of hydroelectric power supply and the necessity for adequate steam reserve capacity to meet emergency conditions.

If the lesson is not plain from this one incident, then a brief study of generation figures will make it so. For the entire United States, hydro generation during 1929 was less than in 1928, whereas production from steam increased 18.5 per cent. Steam carried the entire expansion of electric service for the year. In the Western states hydro generation fell 5.5 per cent below 1928 and steam-generated power approximately doubled. During November California produced 26 per cent less energy from water power than in November, 1928; in Oregon the deficiency was 28 per cent and in Washington, 30 per cent during the same month.

Recitation of these facts does not detract one iota from the value of the West's water power resources, which comprise approximately 80 per cent of the nation's total. These resources will be developed when and if they are economically feasible. The conditions existing during 1929 do point a moral, however, to regulatory commissions, the general public, the power companies and certain politically minded gentlemen who have been overenthusiastic about water power in general. The moral is that stream reserves, although at first glance apparently costly, are necessary for adequate and reliable electrical service. In the last analysis this is what the public wants and is going to demand.

Ideas for the Contractor

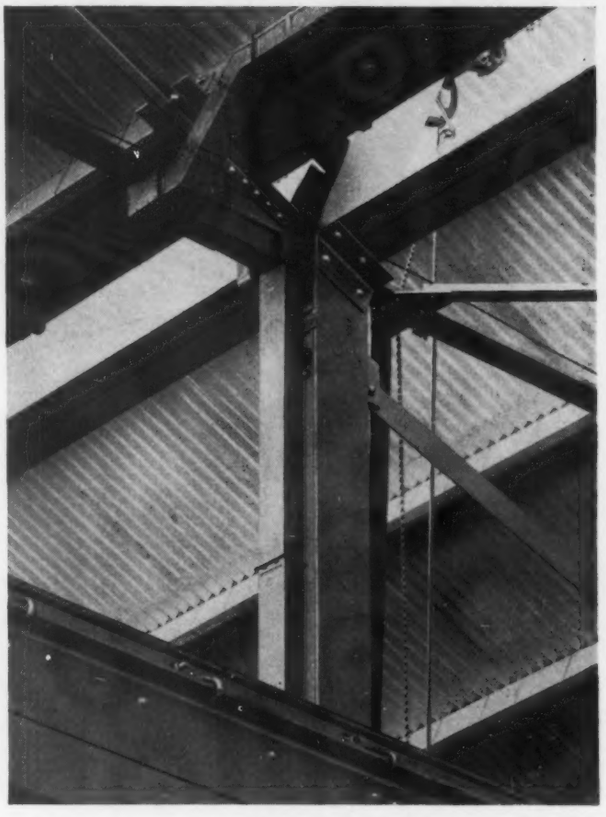
GUTTER WIRING?

Has Important Advantages but Likewise Has Liabilities if Not Properly Installed

ADVANTAGES inherent in the use of metal sectional wiring gutter for more or less general wiring purposes are now aligned against a tendency to restrict the use of this material because of certain electrical disadvantages. Out of the controversy no doubt will come a perfection of the material to overcome the electrical hazards and a more flexible and economical wiring method for industries.

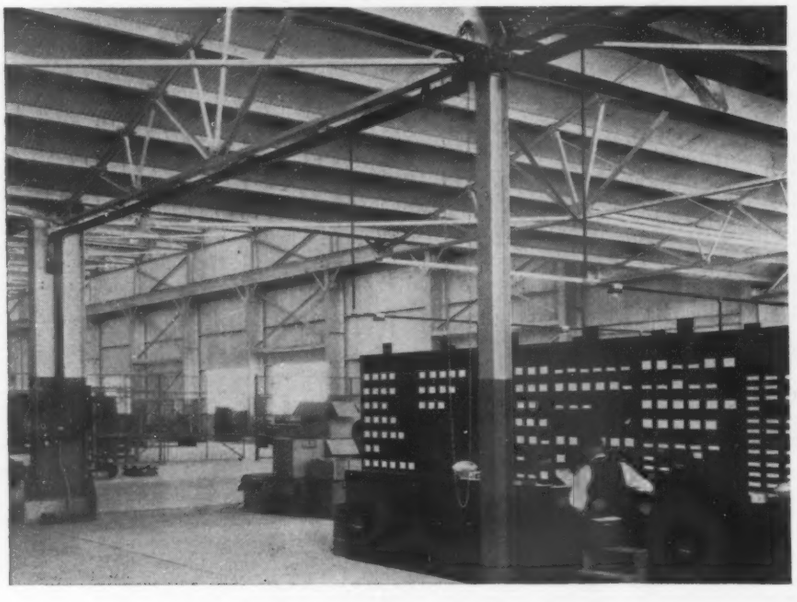
The advantages of metal duct are chiefly physical. With the angle and corner fittings now developed it can be assembled quickly, made to fit the contour of steel roof structures, and is accessible for repairs, alterations and additions—the changes which are constantly demanded in an industrial plant. It can be fished easily and tapped in any place for an outlet or a switch leg. Some types are provided with knockouts on all sides and with hinged covers, making for greater accessibility.

Where ceiling structure makes a conduit job difficult and unsightly at best this duct can be built up to fit around the steel members as shown at right



—*Pictures taken in the Doheny-Stone Drill Company's Plant, Torrence, Calif.*

BELOW: *Duct in this case used for runs from panel board, up to and along the bottom chord of the roof truss, around a pillar and so on. Circuits are dropped from the duct in conduit to serve lights at the bins below*



Some of these advantages are disadvantages, the inspectors maintain. There may be a tendency to cram too many wires in a gutter to save extra conduit runs, they fear, and so limitations on the number of wires in a duct are proposed. From an electrical hazard standpoint the chief objections arise to a general use of duct for circuit runs. Conduit sizes have been determined in part by the capacity of the metal pipe to act as a return to ground in case the wires in them break down. Unless gutters are effectively bonded, trouble may be experienced in case of wire failure in a gutter. Likewise crowding of too many wires in a gutter only adds to this hazard.

The advantages seem to outweigh the disadvantages and would indicate that with satisfactory bonding and reasonable limits to number of wires in a gutter a more general use of the material may be found.

WHAT PRICE VOLTAGE DROP?

A Chart That Shows What Inadequate Copper Costs the Consumer and the Industry

THIS is a page which every contractor, every salesman of lighting and every engineer and architect should tear out and keep for ready reference. It is not often that so drastic a statement is made in these columns, but this table warrants it.

It is a table compiled by J. A. McWilliams, field representative of the California Electrical Bureau, to show in dollars and cents what voltage drop in a lighting installation costs the customer and the utility. With it the customer can be told quickly what too small wire will cost him in energy consumption for a year, compared with what the next sized wire will cost if installed in the first place. It should help sell better wiring jobs for anyone.

A summary of the saving possible on a 100-ft. run of wire follows:

BASED ON 1,000-WATT LOAD

Ten-hour day, 26-day month—12-month annual consumption....3,120 kw.-hr.

Overall loss 100-ft. circuit No. 14 wire 12% or 374 kw.-hr. at 5 cents.....$18.70

Overall loss 100-ft. circuit No. 12 wire 7.4% or 240 kw.-hr. at 5 cents..... 11.50

Annual saving per circuit.....$ 7.20

Approximate additional cost of a No. 12 circuit 100 ft. long.....$ 1.56

In explanation of the table and its use:

CURVE A

C^2R (copper) loss—Based on 1,000 watts (8.7 amp. at 115 volts), for example 8.7 amp. on 200 ft. of No. 14 wire = 4.5 volts loss or about 4 per cent of 115 volts. C-R loss with 8.7 amp. on 200 ft. No. 14 wire is about 40 watts or 4 per cent of 1,000 watts.

CURVE B

Less wattage consumed—Because the lamp (a fixed resistance) is supplied with a voltage below its normal rating.

CURVE C

Wattage loss in lamps—The inability of the lamp to supply the same lumens per measured watt when operated on a voltage below its normal rating.

CURVE D

Copper loss plus lamp loss—Or the sum of curves A and C which represent the total percentage of inefficiency of the consumer's installation.

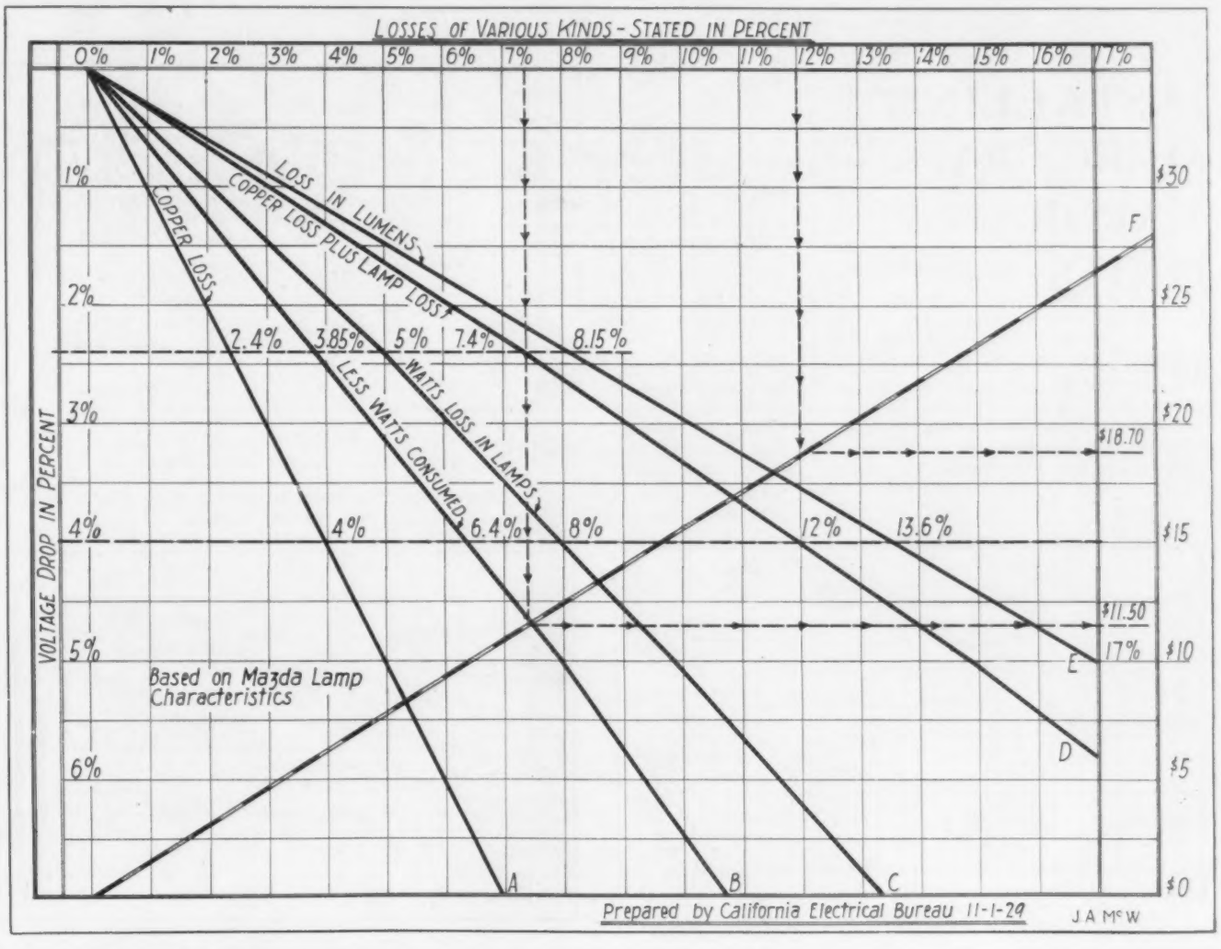
CURVE E

Loss in lumens—Or the per cent loss in light given off by the lamp when supplied with a voltage below normal rating.

CURVE F

Annual loss per circuit in dollars—Based on 1,000-watt load 10 hours a day, 26 days a month, 12 months a year. Total 3,120 kw.-hr. at 5c per kw.-hr.

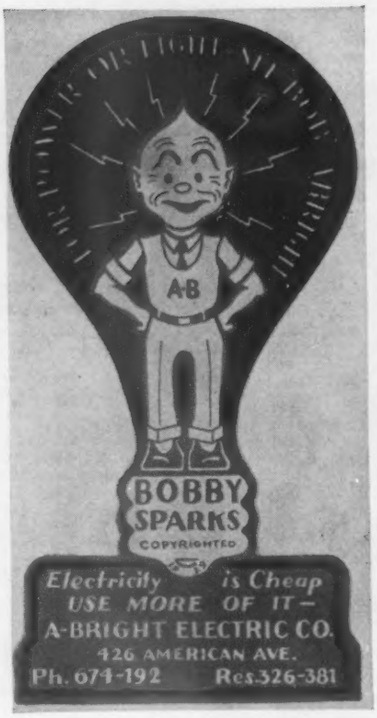
For example, 1,000 watts at 115 volts = 8.7 amp. 8.7 amp. at 115 volts on 200 ft. No. 14 = 4 per cent drop. Starting at 4 per cent voltage drop as shown in the left-hand vertical margin follow across horizontally and copper loss (Curve A) will be found to be 4 per cent wattage loss; Curve C to be 8 per cent, and Curve D, the sum of A and C, to be 12 per cent as shown in the top margin. (Losses of various kinds stated in percentage.) Therefore, the overall consumer loss under this condition is 12 per cent of the total measured wattage. Now, starting at 12 per cent in the top margin follow down until the line intersects Curve F. From this point follow horizontally toward the column on the right-hand margin and read the annual loss per circuit direct in dollars, in this case $18.70.



A-BRIGHT REMARK

Long Beach Electragist Makes a Persuasive Plea for Quality and Price

FALSE economy in seeking "cheap wiring" is debunked very forcefully by Bob Abright, Electragist of Long Beach, Calif., and former city electrical inspector. In a pamphlet which he circulated to all business houses in his community not long ago he set forth convincing reasons for the selection of a good electrician and then for having him work on a labor and material basis rather than a competitive one. The full text of his argument is reprinted here because it makes an excellent selling argument for any quality electrical contractor.



RIGHT: *The trade mark Mr. Abright has adopted and which is used on all his advertising literature*

Select Your Electrician and Stick to Him!

We all have pet ideas about economy and some of these are very positive ones. One that you should know is that you cannot buy *good electrical work* by the yardstick. There is only *one* way to get *good* electrical work done and that is to give the job to a *qualified electrical company* on a labor and material basis.

When such a process is suggested to a business man he goes up in the air; but that is owing to his own lack of experience and not to the fallacy of the theory. Of course, it would be easy for an electrician to get the best of a business man once or twice on this plan, but if he expected to work for him right along, he would not sacrifice future orders to any immediate profit.

In the first place *good labor* is *expensive*. Every time you seek competitive bids so that the price may be slashed, you knock out some essential quality in the work. *Good materials* cost money; *expert labor* costs money; *perfect supervision* costs money. You can take any electrical job and do it from one-half to one-fourth the price, but you will *not* get the same job. You get only what you pay for as a rule. You would not trust a man that offered to *"give"* you something, would you?

The whole theory of getting competitive estimates on electrical work is wrong. You might just as well get an estimate upon a case of diphtheria. True economy demands the *best workmanship* and *materials*. Surely you should be willing to pay a *fair margin of profit* for them.

If we may serve you, we shall be most happy to give you the accumulated experience and knowledge gained in the electrical field through years of active and intensive study.

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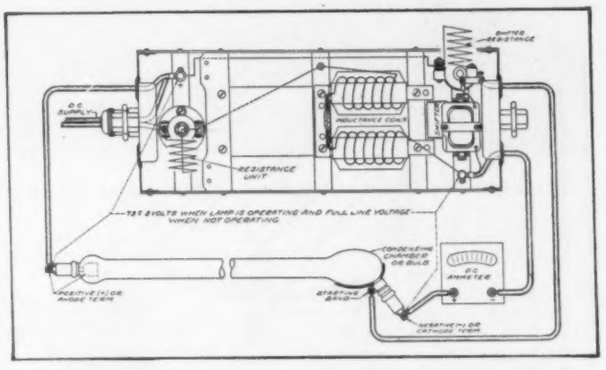
INSTALLING MERCURY VAPOR UNITS

Another Article on the Planning and Selling of Industrial Lighting

By J. R. WILSON
Quality Electric Works, Los Angeles

MERCURY vapor lamps are built in two types, for direct current and alternating current. The direct current type is designed to be operated in multiple on 110-volt, or two in series on 220-volt circuits. In Fig. 1 is shown the wiring diagram for one lamp in multiple, while Fig. 2 shows the connections for two lamps in series. The direct current lamp draws a normal current of 3.5 amp at 110 volts.



ABOVE: *Fig. 1. Wiring diagram for one lamp in multiple on a direct current system*

BELOW: *Fig. 3. Wiring diagram for an alternating current lamp*

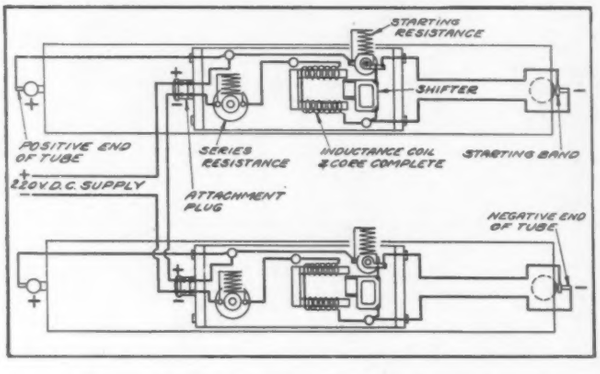
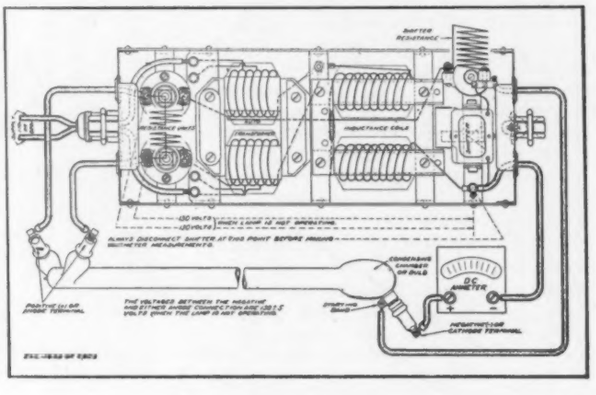
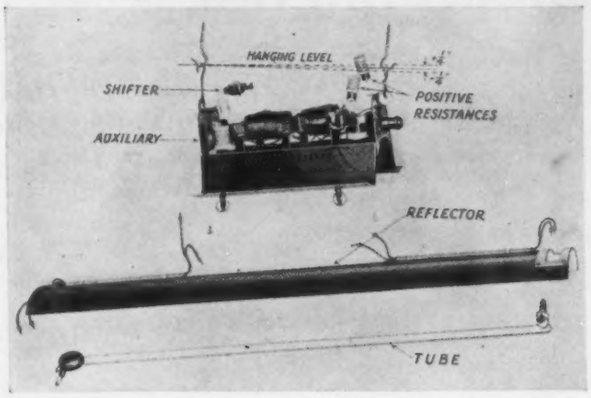


Fig. 2. Wiring diagram for two lamps in series



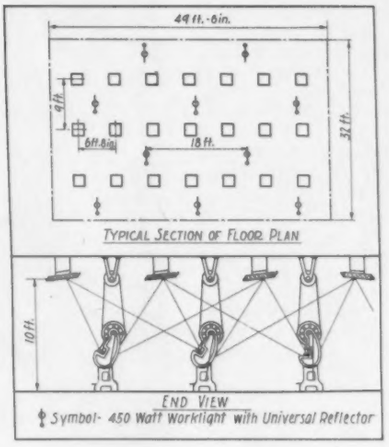
The alternating current lamps can only be used sucessfully on the voltage and frequency shown on the nameplate. These lamps should never be operated on a frequency of lower value than that for which they are designed. They will, however, operate on frequencies higher than their nameplate rating. Thus a lamp designed to operate on 50-cycle frequency can operate on 60-cycle frequency, but the reserve is not true. The alternating current lamp draws 3.7 amp. at 110 volts. In Fig. 3 is shown the wiring diagram for the alteranting current lamp.

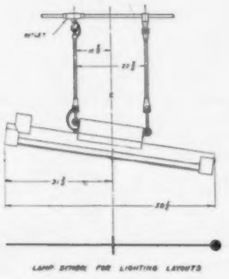
Typical machine shop installation showing suspension of units below shafting. Reflected light illuminates the ceiling sufficiently for work on equipment above it if necessary



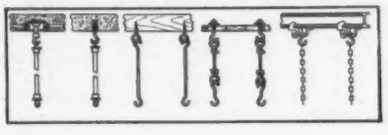
ABOVE: *Parts of a lamp unit showing assembly and two-point suspension with leveling allowance*

BELOW: *All essential dimensions of the lamp and hangers are given, also the method of electrical connection to the outlet. The standard wiring symbol for the mercury vapor lamp is likewise shown below*





ABOVE: *A layout diagram for placing of units in a punch press or other similar machine shop area. Spacing, mounting height and approximate distribution are shown. This arrangement provides for the lighting of two presses per lamp in an area per machine of 75 sq.ft. and results in a distribution of 2.8 watts per sq.ft., or 215 watts per machine, each lamp covering an area of 158 sq.ft.*

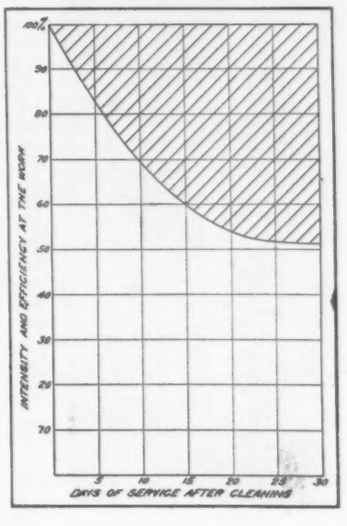


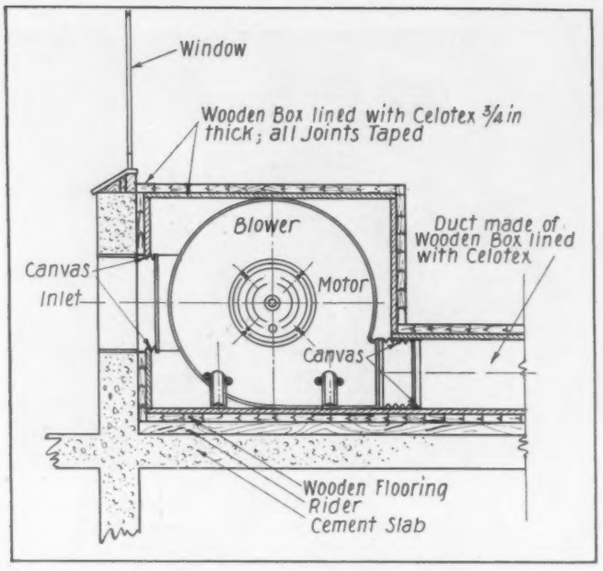
Various methods for the suspension of mercury vapor units are suggested in the drawing at the left. In each case these links or chains are to be of equal length. The tilting of the unit is taken care of by the two links of required length which are attached to the unit and are a part of it

Importance of Cleaning Units

As is the case with all illuminating units for industrial use, the manufacturers of Cooper-Hewitt lamps stress the necessity for proper maintenance. In this connection, it is interesting to quote from their instruction book:

"Good maintenance is next to proper installation and cleanliness is more important than electrical efficiency. The effect of dust on a light source is shown graphically in the diagram below. Clean all lamp tubes and reflectors regularly once a month, wiping them off with a wet cloth with soapy water, ammonia water, or any window cleaning solution. Keep the negative terminal and the starting band free from dust and dirt. Occasionally dust out the inside of the auxiliary to prevent dirt from interfering with the electrical and mechanical operation of the lamp. But above all, clean the lamp tubes regularly and often to make sure that you are getting all the light for which you pay. *One clean lamp will give as much light as two dirty ones.*"





Beautiful and Dumb

SILENCE was demanded of a blower that C. A. Rowley, Electragist, was asked to install in a real estate office in Pasadena. The problem was not an easy one. The blower had to be placed at the front of the office, directly behind and below the window. The duct had to be boxed in and run along the floor to feed an area at the rear. And neither the blower fan nor motor must make any noise.

The diagram above shows how the job was accomplished. A complete boxing of the blower in a wooden housing lined with ¾-in. Celotex was necessary. Connections to the outside air inlet and to the duct were made of canvas to eliminate conduction of sound from the blower to the building at any point. The duct itself was a wooden box lined with Celotex. All cracks and joints were taped and puttied the full distance of the duct.

This material is an effective sound insulator, according to Mr. Rowley, for the blower could scarcely be heard when running and ten feet away could not be heard at all.

▲

Fusing Instead of Soldering

In new motors recently turned out by some of the large manufacturers it will be noted that wires at terminals are fused together instead of being soldered. This is a practice which many motor shops can adopt also in a number of applications. A small blow torch burning ordinary gas and oxygen melts and fuses the copper wire, making a much more permanent joint than solder.

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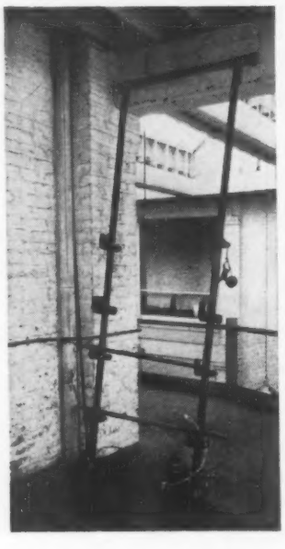

Sturdy Spool Rack

PERMANENT in more ways than one is the spool rack erected in the winding department of the Farnsworth Electric Company, San Francisco. As will be seen in the illustration, this rack is simply fashioned of two heavy upright conduits connected by means of tees to conduits fastened respectively to the ceiling joist and the floor. At intervals of about a foot are clamped fork-like pieces of iron across which a small piece of conduit may be laid to act as an axle for several spools of magnet wire. Braking is cared for by means of a piece of wire thrown over the groove in the spool and weighted with a heavy piece of iron.

motor

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GAS-ELECTRIC DITCH DREDGE

Motor Specialists at Riverside Assemble Equipment for Novel Electric Drive Machine

By W. C. WHITAKER

Resident Agent, General Electric Company, Riverside, Calif.

FLEXIBILITY of electric control is introducing the use of electric motors and equipment in places which would have been undreamed of a few years ago. An instance of this kind is to be found in the new type of dredge developed by the Imperial Irrigation District of Imperial Valley, Calif., for the cleaning of weeds and silt from the irrigation ditches supplying that area with Colorado River water.

Gas engine driven dredges had already proved inadequate to meet the peculiar requirements of this work, which called for a dredge that could straddle ditches of varying widths, travel along them easily and perform the necessary work

Chassis of the dredge before bucket equipment was mounted

of scraping out silt and weeds. The dredges previously used gave considerable trouble in control.

It was my privilege to work out with Mr. Graves, engineer for the district, and Backstrand Brothers, motor specialists of Riverside, the electric drive for a new dredge which now promises to become standard equipment. Backstrand Brothers assembled and built up the electrical equipment from stock motors and control to be described in the following.

It will be noted from the accompanying illustrations that the new dredge is carried on two caterpillar tractors instead of three wheels. The large tractor carries the greater part of the total weight of the machine. The small tractor is carried on the end of a telescopic beam to enable the dredge to work on any width of ditch from 12 ft. to 30 ft. There is a separate motor for each tractor. The motor driving the small tractor is actually mounted just over the tractor, and power is supplied to it through wires carried in conduit supported by the telescopic shaft.

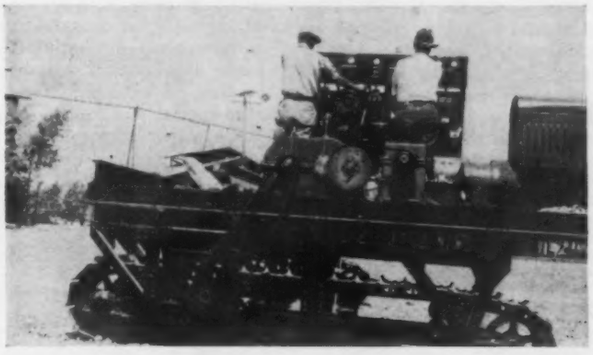
forum

in the interest of a better motor trade

One motor drives the bucket line, another the hoist for raising or lowering the "tail" of the bucket line in the ditch, and another the "shift" for moving the "head" of the bucket line in a direction into or away from the bank of the ditch; that is, in a direction across the tractors. The power plant consists of two direct-current generators direct-coupled to a 30-hp. gasoline engine. Control of all motors and generators is centered at a control stand and is all under the hand of one operator.

The two tractor motors are each rated 7½ hp., 295/1,750 r.p.m., 230 volts, shunt-wound, with approximately 25 per cent speed increase above 1,750 r.p.m. by shunt field control. They are broth driven from one 10½-kw. variable-voltage generator coupled to the gas engine.

This scheme of driving two motors simultaneously under variable voltage control, as well as the reasons for putting



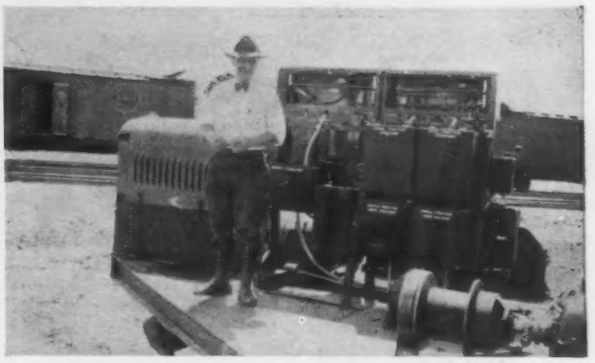
Control board side of the dredge showing power equipment

shunt motors on what would normally be considered a series motor application, will probably be interesting and calls for a little further explanation. Before going into this explanation, however, it should be pointed out that the tractors must be driven at almost any speed from about 4 ft. per minute up to 18 or 20 ft. per minute, depending on the nature of the digging, which varies with different ditches. Also, in traveling between jobs along the highways, a speed of approximately 90 ft. per minute maximum is required. There is a gear shaft in the transmission between the motor and the tractor which is thrown into "low" for ditch digging and into "high" for road traveling. On the basis of motor speed, 1,750 r.p.m. means about 18 ft. per minute in "low" and 90 ft. per minute in "high."

First, as to shunt versus series motors:

A series motor's speed varies with the load. On the small tractor the actual load on the motor will depend on the distance the small tractor is away from the large tractor. With the small tractor close in, the load would be greater; with it far out, it would be less. This would also mean that there would be a corresponding variation in load on the motor driving the large tractor. Obviously, the two tractors under normal ditch work must travel at the same speed. It would be next to impossible to accomplish this with standard drum controller and resistors with series motors.

Shunt motors, on the other hand, are almost ideal for this condition. Slight variations in speed that might cause one tractor to creep ahead of the other, tending to cause the dredge as a whole to move in a circle, are compensated for by field rheostats in the field of each tractor motor. As to torque of the shunt motors for taking care of special conditions, such as climbing up onto a ditch bank to begin work, it should be borne in mind that the horsepower ratings are based on the maximum condition of about 90 ft. per minute road speed. As ditch climbing and other rough work is always done in low gear it will be seen readily that there is ample reserve capacity in the shunt type motor for such conditions.



Back of the control board. Bucket equipment was mounted on this side. Note cable drum in the foreground

The variable-voltage drive was selected entirely on account of the wide speed range required of the tractor motors. The only practical alternative was the constant voltage motor, with shunt field control 4 to 1, and armature control about 2 to 1. This would have resulted in a motor entirely too large in physical dimensions and weight—particularly in view of the fact that the full horsepower would only be required at the high road speed.

The "shift" motor is a CD-45, 1-hp., 850-r.p.m., compound wound. The "hoist" motor is a CD, 3-hp., 1,750-r.p.m., compound wound. On future equipments, both of these motors will be series wound. They were bought as standard compound wound largely because it was a standard winding.

The bucket line motor is a 20-hp., 1,750-r.p.m., compound wound. On account of the necessary correlation of bucket speed and tractor speed, it was not deemed advisable to take chances with possible speed fluctuations of a series motor. This 20-hp. compound wound motor has worked well under severe conditions.

The power plant consists of a 30-hp. gasoline engine direct coupled to a 10½-kw., 250-volt, variable voltage generator with double shaft extension. The end opposite the engine is coupled to a 20-kw., 250-volt, flat compound-wound, constant-voltage generator. The variable-voltage generator drives the two tractor motors. The constant-voltage generator drives the bucket-line, shift, and hoist motors and, in addition, supplies excitation for the variable-voltage generator and the two tractor motors.

The control equipment is all on one control board and can be worked by an operator sitting on a stool. There is a voltmeter on each generator and an ammeter in the tractor and bucket-line motor circuits. Drum controllers are used with all motors. The shift and hoist motors have starting duty resistors. The bucket-line and tractor motors have speed-regulating duty resistors.

It will be interesting to note that drum controllers and speed regulating duty armature resistors are used on the tractor motors which are under variable-voltage control. This is because of the maneuvering required. Both motors operate from the same voltage and the only differential in tractor speeds available without armature resistors would be that obtained by the shunt field rheostats, which would not be enough. Another point is that with both motors operating and without any armature control, the operator might shut one motor down, then try to start it up again, throwing it on the generator at too high voltage. As it is, if he wants to shut down, he turns the drum controller to the full "off" position. Then, in bringing the motor up to speed again, he has to bring it in through resistance in the armature. The scheme is working very satisfactorily.

This dredge has attracted considerable attention among engineers and those interested in irrigation in California and Arizona. It weighs, complete, slightly over 20,000 lb.

It is necessary to work up one side of the ditch and down the other. With the old dredges, it was necessary to take them down off the bank, turn them around, and haul them back up on the bank again. The new gas-electric can be turned around while up on the bank by simply laying timbers across the ditch. It can be turned completely around in a 15-ft. circle.

The old dredges made about a quarter of a mile a day on actual ditch work. The new gas-electric makes about a mile a day on the same work.

News of the Industry

Southern Sierras Company Need Not Reduce Rates

Following a public hearing held in Los Angeles last month, the California Railroad Commission has issued an order rescinding its action of Nov. 4 last, fixing rates of The Southern Sierras Power Company, Riverside, Calif., which would have resulted in a reduction to consumers of approximately $300,000 a year. (ELECTRICAL WEST, Dec. 1, 1929, p. 315.)

Subsequent to the commission's original ruling reducing the power company's rates, attorneys for the company sought and obtained an injunction in federal court, restraining the commission from putting the order into effect, and early last month the commission legally notified the company that it contemplated a reopening of the case.

The action of the Railroad Commission in revoking its original order was based upon a decision rendered on Jan. 6 by the United States Supreme Court in the matter of The United Railways & Electric Company of Baltimore versus the Public Service Commission of Maryland, in which the court held that the operating expense of depreciation which should be allowed to a utility in the fixing of rates should be computed on the basis of the present fair value of the depricable property and should not be computed on the basis of the cost of that property.

In fixing the rates to be charged by The Southern Sierras Power Company, the Railroad Commission explains, the operating expense of depreciation had been computed by the commission on the basis of the cost of the depreciable physical property, and not upon the present appraisal value.

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Seattle City Light Barred From Extending Service

In an opinion given to Mayor Frank Edwards of Seattle, Thomas J. L. Kennedy, corporation counsel, has ruled that Seattle's municipally owned light department has no right to extend its services farther outside the city limits. This opinion agrees with the contention of A. W. Leonard, president of the Puget Sound Power & Light Company. It is stated that the opinion may change the trend of city hall discussions of a recent offer of the power company to buy out the municipal service lines outside the city limits, representing an investment estimated at about $150,000.

This offer brought protest from J. D. Ross, city superintendent of city lighting, who held that contrary to Mr. Leonard's views, it would be perfectly legal for his department to keep on reaching out for suburban business so long as it did not invade any other incorporated city. Mr. Kennedy holds that the right of the city to make further extension into outside territory was cut off in 1915 by repeal of a law giving such power. He stated, however, that the city may continue to serve the customers on the lines extended outside the city limits prior to that time. Mr. Leonard offered to pay cash for the outside lines or to credit their value on the city's account for the purchase of power substations which the city is taking over from the Puget Sound company for the operation of the municipal street railway system, which it also bought from that company.

Two Washington Companies Reduce Lighting Rates

Reduction in lighting rates to all commercial and residence consumers outside the city limits of Seattle have been announced by both the Puget Sound Power & Light Company and the Seattle City Light Department. The new rate will go into effect on March 1. The Puget Sound Company's reduction ranges from ½ cent to 1 cent a kw.-hr. in the primary rate, and it is estimated that the reduction will result in a saving of $200,000 annually for consumers.

The rate for outside current supplied by the City Light Department will be 6 cents for the first 35 kw.-hr. instead of 7 cents as formerly, 2½ cents for the next 115 kw.-hr. and 2 cents for all over. The reduction applies only to the first 35 kw.-hr., the rest of the schedule remaining the same. Concurrent with the announcement of the City Light Department reduction schedule is a statement that the city will increase its steam generating capacity in 1930 by 13,000 hp.

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Salt Springs Rock-Fill Dam Under Construction

GRANITE dynamited from a solid wall is shown here taking shape as the upstream face of the Pacific Gas and Electric Company's Salt Springs Dam on the Mokelumne River, Calif. Three derricks may be seen at work lifting rock from the loose dump and laying it in the placed-rock section; fill-in of smaller rock is done by hand. When completed, the placed-rock section will be covered with a layer of concrete 3 ft. thick at the base, tapering to a thickness of 1 ft. at the crest. The power house will be located close to the downstream face of the dam, which, when completed, will be 360 ft. high, with a crest length of 1,320 ft. and a thickness at the base of 960 ft.

City of Tacoma Plans Hydro Project on Cowlitz River

Filings have been made on behalf of the City of Tacoma, Wash., with the state hydraulics office in Olympia, contemplating a hydro-electric municipal power development on the upper reaches of the Cowlitz River. This is designed to supplement the city's Lake Cushman and Nisqually River plants now in operation. The plant includes the diversion of 125 sec.-ft. of water from Clear Fork stream into Packwood Lake in Lewis County by means of a tunnel 10 x 12 ft. in diameter and 5.4 miles long, and the impounding of 65,000 acre-ft. of water in the Lake by means of a dam 105 ft. high and 600 ft. long, of rock-fill and concrete-core construction. The cost is put at $1,500,000 for the tunneling and $755,700 for the reservoir.

The application seeks the appropriation of 250 sec.-ft. of water from Lake Creek to be conveyed to the power plant by means of 16,000 ft. of tunnel and 6,000 ft. of pipe line, this work and the generating plant to cost approximately $6,120,000.

In the Packwood Lake power project, the city will have a project with a potential 40,000 to 50,000 continous horsepower, with storage sufficient for a complete regulation of the stream, and with the largest head of any power project in the section thus far studied, more than 1,700 ft., according to the statement made by Commissioner Ira A. Davisson in explaining the filings. The Packwood Lake project will justify probably 60,000 to 90,000 hp. generator capacity, according to the load it will be expected to carry in conjunction with the other units on the City of Tacoma's system.

Filings at Olympia give the preliminary estimate of the cost of the project as $8,375,000.

The Cowlitz River filings followed closely the surrender by the City of Tacoma of options on prior filings on the Ducabush, Dosewallips and Hama Hama Rivers, in the Hood Canal district.

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City of Los Angeles Again Seeks to Acquire Utility

The Board of Water and Power Commissioners of the City of Los Angeles passed a resolution at the close of the year urging the acquisition by the City of Los Angeles of the entire electric system of the Los Angeles Gas and Electric Corporation. The resolution incorporated the provision that the purchase should be made at a fair valuation to be determined "by mutual agreement, if practicable, or by the California Railroad Commission."

The Los Angeles Gas and Electric Corporation will not consider the proposal of the municipal bureau of water and power that the city should purchase its system, according to an announcement made by Addison B. Day, president of the corporation. "The city has been trying for years to get control of our system," said Mr. Day. "We have refused to sell in the past and shall continue to refuse in the future. We consider that to give the water board a full monopoly of the electric business in the city would amount to a major calamity. The fact that the city's system competes with ours is the only thing that keeps the prices down to their present low level. The city has a monopoly in water service, and water rates are constantly going up. It is forced to compete in the power business and power rates are constantly being cut. At present our rates are actually 10 per cent lower than the city's since we are forced to pay taxes and the city's system is not, but competition is needed to keep these low prices in force."

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G. C. Tenney Now Editor of Electrical West

A recent change on the staff of ELECTRICAL WEST places George C. Tenney, formerly managing editor, in full charge of the editorial policies of the magazine, with the title of editor. Charles T. Hutchinson, formerly editorial director, has relinquished that office to become publishing director.

GEORGE C. TENNEY

Mr. Tenney's promotion is the result of several years spent in building up ELECTRICAL WEST'S service to its readers, dating from 1921, when he joined the organization as news editor. In addition to selecting and preparing much of the material that appears in the pages of ELECTRICAL WEST, he has at his command what is probably the most comprehensive fund of statistical and other data concerning the electrical industry in the Western states that exists.

Mr. Tenney has been acting in the capacity of managing editor since 1923, with Mr. Hutchinson as editorial director.

Subjects Listed by N.E.L.A. for 1930 Prize Awards

Announcement has been made of 1929-30 prize awards to be administered by the National Electric Light Association for the best papers on subjects relating to the electric light and power industry.

The awards offered are as follows:

Doherty Prize, General: A gold medal donated by Henry L. Doherty, president, Henry L. Doherty & Company, for the best paper on any subject relating to the electric light and power industry.

H. M. Byllesby, Accounting Prizes: Cash awards of $250, $150 and $100, donated by H. M. Byllesby & Company, in memory of Colonel H. M. Byllesby, for the three best papers showing how to increase the usefulness of the accountant in the public utility industry.

Martin J. Insull Public Relations Prize: A cash award of $250 donated by Martin J. Insull, president of the Middle West Utilities Company, for the best paper dealing with public relations in the electric light and power industry.

James H. McGraw Engineering Prizes: Cash awards of $250, $150, and $100, donoted by James H. McGraw, chairman of the board, McGraw-Hill Publishing Company, for the three best papers on any engineering or technical subject relating to the electric light and power industry.

James E. Davidson Commercial Prizes: Cash awards of $250, $150 and $100, donated by J. E. Davidson, president, Nebraska Power Company, for the three best papers dealing with commercial or merchandising problems of the electric light and power industry.

Contestants should be guided by the following rules in submitting manuscripts:

Any person or persons engaged in the electrical industry is eligible to submit papers and enter the competition.

Papers must be the original work of the authors, prepared exclusively for this competition. The prize for which a paper is submitted should be indicated.

On the first page of the manuscript the following information should be shown:

Submitted for the 1929-1930.....Award
Title of paper.....
Submitted by (name of author).....
Employed by (name of company).....
Employed as.....
Address(street, city, state).....

There are no restrictions on the number of papers which may be submitted by contestants.

Papers may be of any length, and pen and ink drawings or photographs suitable for reproduction may be included.

Papers should be typewritten on one side only.

Practicability of the idea incorporated in the paper, clearness, and conciseness of expression are points on which the papers will be judged.

Papers will not be returned to contestants, but will become the property of the N.E.L.A. and will be available for inspection at N.E.L.A. headquarters to anyone interested. The right to publish in the *N.E.L.A. Bulletin*, or otherwise, any papers entered in the contest is reserved.

There is no limitation on subject matter, as the prizes cover every subject relating to the industry. A specific paper, however, is preferable to a general paper and authors should make some practical application of their subject to the solution of the industry's problems.

Papers should be forwarded to the secretary, National Electric Light Association, 420 Lexington Ave., New York City, before April 1, 1930. Papers mailed after this date will not be considered by the judges.

Announcements of prize winners will be made at the N.E.L.A. convention to be held in San Francisco June 16-20, 1930.

Three Problems in Boulder Dam Financing Solved

One item included in fixing the tentative sale price of 1.63 mills for power generated by Boulder Dam has been eliminated entirely as a charge against power revenues and two other items have been scaled down by an opinion rendered by Attorney General Mitchell at the request of Secretary of the Interior Wilbur. The tentative price embraces interest charges on approximately $40,000,000 to be advanced by the government for construction of the All-American Canal, amortization within a 50-year period of $25,000,000 allocated to flood control, and the payment of interest on the unpaid principal during that period.

Attorney General Mitchell held that advances for construction of the canal should not bear interest, that the $25,000,000 allocated to flood control must be amortized but not within any certain period of years; and that if interest is to be paid on the flood control allocation, payment may be deferred indefinitely and the sale rate of power need not be fixed high enough to meet this charge from year to year. The attorney general reserved decision on whether or not interest is to be paid on this sum.

In answer to the protest of the upper basin states that the tentative rate of 1.63 mills to be charged for Boulder Dam power is too low, Secretary Wilbur addressed a letter to the state officials on Dec. 27, declaring that that rate is the maximum that can be demanded against the competition of immediately accessible resources of oil and gas and that the price already is higher than present-day steam competition requires. If power generated from oil and gas in Southern California can be sold there at a lower price than power transmitted from Boulder Dam, after payment of 1.63 mills at the penstock, it follows, said Secretary Wilbur, that the power cannot be sold in that market at the rate of 1.75 mills proposed by the upper basin states, without bankrupting the bidder. Secretary Wilbur's letter dismissed the argument made by the upper basin states concerning the price to the Metropolitan Water District of stored water with the statement that "if power can pay the way I see no necessity for requiring domestic water to bear an undue burden."

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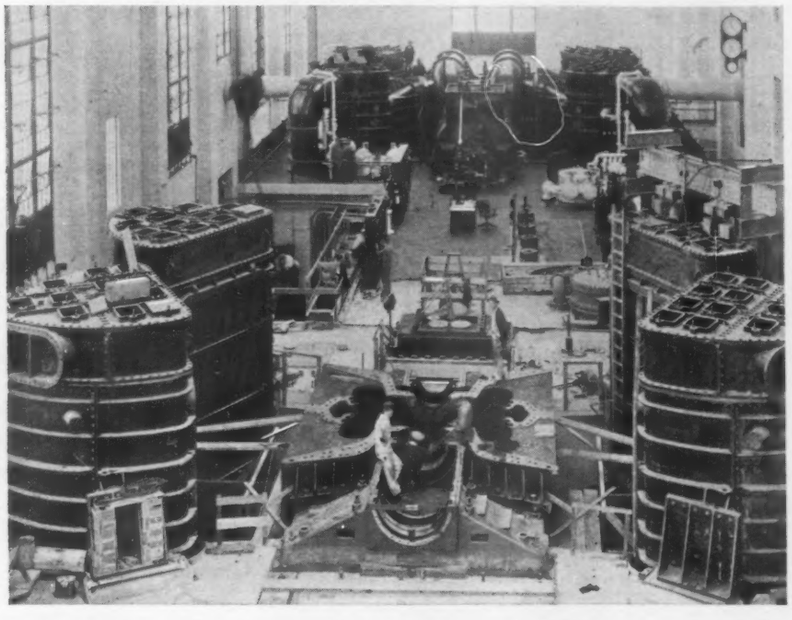
Long Beach Steam Plant's Newest Unit



FOUR vertical condensers and bedplate for a 100,000-kw. single-unit turbo-generator shown in process of installation at Long Beach No. 3 steam plant. The equipment is for unit No. 11 scheduled for operation in March. The four condensers and 100,000-kw. generator of unit No. 10 already are housed in this building and may be seen at upper center. Also noticeable is the twin-unit grouping of controls, by means of which one operator will control the operation of both units.

The 200,000 kw. that will be generated by these two units when No. 11 goes into operation will total half the installed capacity of the entire group of Long Beach plants. It is interesting to reflect that the steam generator capacity at Long Beach with the present unit in operation will equal the total amount of electric power being produced by steam in the State of California on Jan. 1, 1924.

Pepco Valuation Hearing Again Resumed

The alleged inclusion of certain intangibles in the 1916 valuation of the Portland Electric Power Company, Portland, by the Oregon Public Service Commission, formed the basis of the principal controversy in the hearing on the valuation of that company's properties resumed Dec. 26 in Portland and completed Jan. 2. Voluminous exhibits pertaining to various items of property and to operating costs were introduced by the city, the company, and the commission itself. Testimony bearing on the request by the company for a raise in street railway fares was heard at the same time because of the close relationship of this phase of the question to the light and power case.

The intangibles which Carey & Harlan, the city's experts, alleged had been erroneously included in the 1916 valuation amounted to over $13,000,000, segregated as follows: Overhead on real estate, $645,000; value of water rights, $4,187,000; development cost, $4,292,000; and depreciation, $4,220,000.

Controversy arose because the commission's valuation of all the company's utility property, set in 1916 at approximately $46,000,000, was not itemized. Analysis of that case, in which consideration was given to original cost, prudent investment value, the cost of reproduction, and the company's financial structure indicated that the prudent investment value at that time, divested of any intangibles whatever, amounted to $40,000,000 in round figures. The company contended that $1,100,000 of the other $6,000,000 represented working capital whereas the balance was the reasonable value of water rights, going concern value, and other legitimate intangibles. One of the main contentions of the city was that in 1916 more weight was given to the cost of reproduction theory of valuation than to any of the other factors and that depreciation, which should have been deducted in a valuation based on that theory, was ignored.

The company's claim to value on water rights at certain of its hydroelectric sites on the Clackamas and Willamette Rivers was based on the fact that vested rights to the actual water at these points had been acquired by the company's predecessors prior to the Desert Land Act of 1877, which transferred the ownership of water to the states and made possible the use of the state's water by appropriation rather than by riparian ownership.

At the conclusion of this phase of the hearing the city was granted 30 days in which to file a brief, and the company ten days in which to reply, after which the city would be allowed five days for its rebuttal brief. The street car fare case was continued indefinitely to allow time for the city's experts to present a plan they now have under consideration for a radical change in the methods of supplying the city with mass transportation. Submissions of

suggested light and power rates based on the hoped-for reduction in valuation as the outcome of the valuation hearing will also be permitted when the street railway hearing is resumed.

An interesting development growing out of the hearing to date has been the unanimous agreement of all parties concerned that there should be strict separation of the street railway branch of the business from the light and power branch with each department in such separation being made to stand on its own feet. Under this arrangement, instead of allocating power costs to each department on the basis of the proportionate amount of energy taken by each department, the pooled power would belong to the light and power department and would be sold to the railway department just as it is to any other customer. A reasonable rate for such energy was agreed on in the instant case at 8 mills per kw.-hr.

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San Joaquin Company Will Build New Steam Plant

Plans for the construction of a 35,000-kw. steam generating plant at an estimated cost of $3,500,000 by the San Joaquin Light & Power Corporation, Fresno, Calif., were announced last month by A. Emory Wishon, vice-president and general manager. Work will start by March 1, and the schedule calls for completion of the project by June, 1931.

Harold K. Fox, chief construction engineer for the San Joaquin and Great Western companies, will design and build the plant, which will be of the single-unit type, housed in modern steel and concrete buildings. Natural gas will be used as fuel although the boilers also will be equipped to burn oil if necessary.

The plant will follow the same general design as the new India Basin steam plant just completed by the Great Western Power Company.

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Electric Rates to Be Cut in Vancouver, B. C.

Electric light and power rates in the former mulicipalities of Vancouver South and Point Grey, now incorporated in the greater city of Vancouver, will be cut to old city levels March 1 next, according to a recent announcement of W. G. Murrin, president of the British Columbia Electric Railway Company, Ltd.

Existing domestic rates are: Vancouver City, primary rates, 4 cents per kw.-hr.; secondary rate, 2 cents per kw.-hr.; Point Grey and South Vancouver, primary rate 5 cents per kw.-hr., secondary rate, 2 cents.

Commercial rates, primary and secondary, are similar to the above and will receive the same reductions. General power rates are applicable in all districts of the lower mainland of British Columbia, and there will be no change in these.

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Construction Crew—1896

"LIGHTS OUT" in Los Angeles in 1896 meant a trouble call sent—by messenger, we suppose—to the construction and maintenance department, shown above, of the West Side Lighting Company, forerunner of the Southern California Edison Company. F. J. ("Sammy") Darnell in later years discarded his arc light "repair truck," but he himself still has a hand in keeping the lights burning for the Edison company as superintendent of the North Hollywood district.

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Pasadena to Buy Edison Co. Pine Canyon Holdings

The City of Pasadena, Calif., and the Southern California Edison Company have arrived at an agreement whereby the municipality will buy the company's holdings in Pine Canyon, including about 1,000 acres of land, the Azusa electric plant, appurtenances and all rights in the canyon. The board of city directors has approved the project and authorized the payment of $25,000 as an option on the property for two years at the price of $783,494, and the transfer of the property has been approved by the California Railroad Commission.

Under the terms of the agreement, all power produced at the 1,500-kw. Azusa plant, after acquisition by the city, shall be turned over to the company at the plant and then transmitted over the company's lines to Pasadena, and the city is to be permitted to draw at any time during the year the total amount of power produced in any year. The city is to pay to the Edison company a transmission charge of 0.002 cent per kw.-hr., a rate which entitles it to take power during peak loads if it desires.

Pine Canyon dam site lies wholly on Edison company lands, and through the agreement described the city is enabled to proceed immediately with further testing of the site as a location for a high dam to impound excess flood water for domestic water supply.

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Utilities Present Rebuttal at Federal Investigation

The case for the utilities in the Federal Trade Commission's investigation of alleged propaganda activities of the power companies was opened in Washington early last month.

The question as to whether certain bulletins distributed for school use by various state public utility information committees contained propaganda against public ownership was raised by Bernard F. Weadock, special counsel for the utilities, who presented these bulletins for introduction in the record with the statement that no direct reference was made in them to public ownership and operation, except in one instance. Mr. Healy, chief counsel for the commission, said he was willing to admit that there is no direct mention of municipal or government ownership or operation in the pamphlets, but "I do maintain," he said, "that there are documents in this record which tend to show that all the things said to justify private ownership were all directed to the end of sustaining private ownership and forestalling efforts in favor of municipal ownership." Data presented by Mr. Weadock disclosed that requests for the pamphlets and commendatory letters received from school officials and teachers totaled 7,932.

To refute the statement made in evidence previously presented to the commission that the electric light and power companies either are spending or propose to spend up to $30,000,000 for newspaper advertising during the period of one year for the alleged purpose of influencing editorial opinion, Mr. Weadock presented a survey estimating their total advertising expenditures in 1928 at $13,044,143, which amounted to 0.683 of 1 per cent of the gross revenues of the industry for the year. He showed that advertising by the utilities was necessary either to provide new financing, to sell electrical appliances or to promote the wider use of electricity, and that, when compared with other industries, the percentage of gross revenues used for advertising by the utilities has been small.

The only witness who is expected to be called upon to testify in defence of the alleged propaganda activities of the public utilities, Preston S. Arkwright, president of the Georgia Power Company and chairman of the public policy committee of the N.E.L.A., took the stand on Jan. 14. Mr. Arkwright pointed out that opposition to public ownership and operation is not the sole inspiration of the public relations and publicity work of the utilities. He prefaced an elaborate description of

the association's public relations and publicity work with an explanation of its motives. Public antagonism is easily aroused against the public utilities, he said, because bigness itself excites suspicion and because they deal more intimately with more people than any other enterprise in the community. With reference to public ownership and operation Mr. Arkwright said that the electric light and power industry did not initiate this question, and that its position is one of defense against the proposal made by others to change from the present philosophy of private ownership to government ownership.

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Merced Falls Plant to Be Modernized

Operations are under way at the Merced Falls plant of the San Joaquin Light & Power Corporation, Fresno, Calif., to replace the present 600-hp. installation with a modern plant capable of generating 4,580 hp. It is expected that the new plant will be completed by early summer.

The changes in the plant will include enlargement of the present dam, which is 500 ft. long and 20 ft. high. Three and a half feet of concrete will be added to the donwstream face and the level of the dam will be raised 1 ft.

The new plant will be semi-automatic and will generate at 12,000 volts. It will cost approximately $330,000.

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Light Snows in Colorado Threaten Water Supply

Western Colorado is threatened with serious shortage of water in 1930 on account of unusually light snowfall this winter. The situation at Ward Lake on the Grand Mesa is typical of conditions on the western slope, according to Ray Peck, forest supervisor for the district. Snow depth at the lake is now less than 10 in.; an average at this season during the past ten years has been 44 in.

Unless heavy snowstorms occur during the next few months, irrigation and water power facilities will be badly impaired next summer and fall, Mr. Peck predicts.

Snow lies less than a foot deep at altitudes of more than 10,000 ft. Usually these places are heavily banked early in November.

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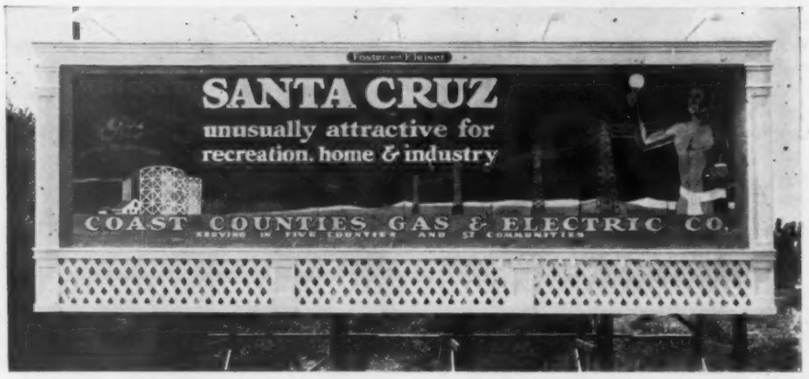
TACOMA TO BUILD STEAM PLANT—Plans for a $2,000,000 steam generating plant to be built by the City of Tacoma's municipal lighting and power department are being completed by engineers of the lighting department, and official call for bids for the turbo-generator and accessory apparatus, including transformers, oil circuit breakers, switchgear, and other equipment will be made in the near future. The steam plant, developing 25,000 kw., will supplement the hydro-electric developments at La Grande and Lake Cushman plants.

To Help Communities Grow



THE Coast Counties Gas & Electric Company, whose service extends throughout five counties in California, is co-operating with the communities it serves by maintaining in them a series of outdoor display boards similar to that shown above. By attracting industries and settlers to a district the power company creates for itself a wider market for the service it has to sell.

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65-Mile Tie Line Links Two Northwest Systems

The new 110-kv. single-circuit transmission line extending from Dixonville to North Bend, Ore., a distance of approximately 65 miles, known as line 20 of The California Oregon Power Company, connecting the system of The California Oregon Power Company with the system of the Mountain States Power Company in the Coos Bay district, has been completed and placed in service. This line is connected to line 12 of The California Oregon Power Company at Dixonville. Line 12, approximately 123 miles in length, extending from the Prospect hydro-electric plant north to Springfield, Ore., had formerly been operated at 66 kv. In connection with the construction of the new line, line 12 was reinsulated for 110 kv. by the addition of three insulators per string, spacing for this voltage having been originally provided in its design.

The new line 20 and the increased voltage on line 12 necessitated new or enlarged substations at Prospect and Dixonville on the California Oregon system and at Springfield and North Bend on the Mountain States systems.

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PEND OREILLE RIVER PROJECT PLANNED—The West Kootenay (B.C.) Power & Light Company plans hydro-electric development of 350,000 hp. on the Pend Oreille River about seventeen miles from the junction of that river with the Columbia River, according to plans submitted to the Provincial Water Comptroller. The cost of this project is estimated at approximately $18,000,000, and it will involve the building of a dam 350 ft. high. The company expects the plant to be completed four years from the date of commencement. The chief customer for the power thus developed would be the Consolidated Mining & Smelting Company at Trail, B. C.

N.E.L.A. COMMERCIAL COOKING SCHOOL—The 1930 N.E.L.A. commercial cooking school will be conducted during the week of March 10 at Chicago. The school this year will review the elementary work taken up last year and will cover considerable work of an advanced nature. Stress is to be laid on kitchen and bake shop practice and terms, chemistry of baking, how and when cooking and baking are done, why special equipment is best suited to a particular job, kitchen and bake shop layouts and calculations. The course is designed so to equip a range salesman that he can walk into a kitchen with suggestions that will show a knowledge of the business of the chef, the cook or the baker.

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READY FOR EXCAVATION FOR RUSKIN DAM—With sealing operations practically completed on the two cofferdams at the Ruskin Gorge on the Stave River, B. C., the site of the permanent concrete dam that is one of the main items in the newest hydro-electric development of the British Columbia Electric Railway Company is now pumped dry and ready for excavations. The river was diverted from its original bed through a timber and concrete flume two months ago. Work is now proceeding on the foundations of the power house, which is to be situated on the east bank of the river.

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BIDS CALLED FOR CENTRALIA'S HYDRO PROJECT—The City Commission of Centralia, Wash., has instructed the city clerk to prepare a call for bids for construction of the power plant for the municipal hydro-electric project on the Nisqually River. Date for opening bids has not been set. The power plant will be located on the river near Yelm. A diversion dam near McKenna and a 9.6-mile canal have been completed, at a cost of $200,000.

P. G. and E. Co. Rates to Be Reduced March 1

CONSUMERS of the Pacific Gas and Electric Company are expected to benefit to the extent of approximately $2,392,710 a year, as a result of orders issued by the California Railroad Commission reducing rates of that company. The reduced rates, which will before effective March 1, 1930, are the result of proceedings instituted by the commission on its own motion for the purpose of determining why the electric rates of the company should not be reduced immediately, because of high earnings under the existing rates. The new electric rates are in effect interim rates, to continue in effect until future action of the commission is necessary. They are expected to result in a return to the company of approximately 7½ per cent upon its rate base during the period over which they are expected to prevail.

The decision contemplates the following reductions in electric revenue of the company:

Service	Amount of Reduction	Per Cent Reduction
Street lighting	$ 35,000	2.06
General lighting (L schedules)	1,425,800	7.95
General lighting, cooking and heating (D schedules)	68,200	3.51
General power, P-1, P-2	295,600	4.59
Agricultural Power, P-3	101,400	2.72
Wholesale power, P-5	120,100	3.47
Inter-department	20,000	.....
Incidental lighting	50,000	.....
Total (year 1929)	$2,116,100	5.01
Plus 10% growth	211,610	
L to D consumers	65,000	
Total (year 1930)	$2,392,710	

It is estimated that the above reductions will reduce the rate of return of the Pacific Gas and Electric Company as follows:

	Present Rates	New Rates
Rate base	$246,455,943	$246,455,943
Net revenue	20,909,800	18,793,700
Rate of return	8.48%	7.60%

The change in schedules brings about a reduction in domestic and commercial lighting rates of ½ cent per kw.-hr. in the first block with graded reductions in succeeding blocks.

The same ½-cent reduction applies to the first block in the combination lighting, cooking and heating rates. Minimum charges for the combination schedule have been considerably reduced. Hereafter no minimum charge other than the service charge will be assessed for installations not in excess of 8 kw. For larger installations the minimum charge will be 40 cents per kw. for each kw. in excess of 8, additive to the service charge, as heretofore. The minimum charge on all space heating equipment will be waived during the summer period. Cumulative minimums have been abolished.

In the power schedules the size of the blocks has been reduced in some instances, and in others there have been reductions of 1 mill per kw.-hr.

There has been a general tendency to make rates uniform throughout the company's system.

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Colorado Utility to Promote Electric Sign Advertising

The Public Service Company of Colorado has inaugurated an electric advertising sales department following the signing of a contract with the General Outdoor Advertising Company, under which the latter will produce, or have manufactured under its supervision, Rainbow luminous tube products for the former to sell.

Harold T. Rankin, manager of the Public Service Company's lighting department, will have charge of the new division, which will begin operations with a personnel of five men.

The new policy of the Public Service Company contemplates tying in luminous tubes with electrical display advertising on a larger scale than previously, and through its new sales division the power company will handle all sales of illuminated sign advertising in its territory, while the General Outdoor Advertising Company will confine its activities to the sale of billboard displays.

The Rainbow organization has erected a plant for the production of luminous tubes adjacent to the headquarters in Denver of the General Outdoor Advertising Company and its operations in that city will be directed by the advertising company.

FINANCIAL NEWS

Commission Reports on 1929 Utility Financing

During 1929 the California Railroad Commission authorized the issuance of $103,288,473 of stocks, bonds and notes by several classes of utilities, including steam railroads, electric railways, gas and electric companies, water companies, telephone and telegraph companies, warehouses, carriers by water and automotive carriers, as against $148,929,337 authorized in 1928.

Of these totals, the amounts of securities authorized to be issued to finance construction costs decreased during 1929 from $103,416,277 to $71,718,736, according to a statement released by the commission. The statement continues: "It appears that this decrease was due in part to the fact that during 1928 a considerable volume of stock was authorized to be issued by telephone companies for purposes which were not of an annual nature and by the fact that few gas and electric companies found it necessary or desirable to expend large sums for production facilities. It appears, however, that electric and gas companies continued the expenditure of large sums of money for transmission and distribution facilities. The reports of the commission show that for new properties, California Oregon Power Company was authorized to issue $1,500,000 of common stock; Pacific Gas and Electric Company, $22,752,000 of stock; Southern California Edison Company, $16,400,000 of stock and $17,000,000 of bonds; San Diego Consolidated Gas & Electric Company, $3,000,000 of stock; Santa Maria Gas Company, $1,199,300 of stock; and Southern Counties Gas Company of California, $2,000,000 of stock. In addition, there was pending at the close of the year an application of the Southern California Edison Company to issue an additional $7,075,000 of its common stock to carry on its construction work during 1930.

"The amount authorized for reorganization purposes closely approximated the amount granted in the preceding year."

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$12,000,000 Is 1930 Budget of Three Companies

The 1930 construction budgets of the Northwestern Electric Company, the Pacific Power and Light Company and the Inland Power & Light Company amount to approximately $12,000,000, according to a statement made last month by Guy W. Talbot, president, Pacific Power & Light and Northwestern companies. The largest single item is $4,000,000, which will be spent in 1930 on the first 40,000-kw. unit of the Ariel development. A like amount covering the entire cost of this first unit will be carried over into 1931 when the completion of the first unit is expected.

Eighty miles of 110-kv. transmission line between White Salmon and Yakima, Wash., to constitute the first link in tying in the systems of The Washington Water Power Company, Spokane, and the Northwestern Electric Company, Portland, will be built during 1930, according to Mr. Talbot.

This transmission line, which is to cost $1,100,000, will connect the Condit plant of the Northwestern Electric Company with the Yakima-Walla Walla system of the Pacific Power & Light Company. Other connecting links to be constructed subsequently will be a new 110-kv. line between White Salmon and Vancouver, Wash., to be built after the new Ariel plant of the Northwestern company on the Lewis River is placed in operation, and a short piece of 110-kv. line between

Yakima and Taunton, Wash., where the Washington Water Power system is now tied in with the Pacific system.

Other transmission expenditures by the Northwestern company include an additional line from Vancouver, Wash., to Albina substation in Portland to pave the way for bringing Ariel power into Portland next year. The Pacific Power & Light Company contemplates rebuilding several miles of twenty-year-old 60-kv. line rapidly becoming inadequate. Both companies are contemplating the outlay of large amounts in the normal development of their transformation and distribution systems.

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$2,000,000 Building Program for Southern Sierras Co.

The 1930 construction budget of The Southern Sierras Power Company, Riverside, Calif., calls for an expenditure of $2,000,000, including approximately $400,000 that it is estimated will be expended on the Seal Beach line now under construction. The budget for all the associated companies, subsidiaries of The Nevada-California Electric Corporation, including The Southern Sierras company, will be approximately $2,250,000. This budget will be allocated as follows: Hydro development, $137,350; transmission, $1,004,500; distribution, $916,625; and miscellaneous, $178,389.

One of the most important features of the 1930 program is the announcement of the proposed construction of a new power line from Calipatria or Niland to Blythe, including a terminal at Calipatria and one at Blythe, the total cost to be approximately $328,000, for the purpose of taking care of the increasing demand for power and light service in the Palo Verde Valley.

Substantial improvements also are included in Imperial Valley, San Bernardino County, and other areas, including $100,000 for the resurfacing of Hillside Dam.

The 1929 expenditures of The Southern Sierras Power Company and associated electrical companies for additions and betterments included $650,000 for line extensions and distribution substations, $215,000 for additions and betterments to the hydro-electric property, and an expenditure of $300,000 for general improvements.

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EDISON COMPANY STOCK ISSUE—The Southern California Edison Company, Los Angeles, has been authorized by the California Railroad Commission to issue and sell on or before Dec. 31, 1930, to its present stockholders at par, $7,075,000 of common capital stock, and to use the proceeds derived from its sale to reimburse its treasury on account of moneys expended for additions and betterments. The company proposes to sell the stock to its own stockholders in the ratio of one share of new stock at par for each ten shares of old stock held by the purchasers.

TIME EXTENSION GRANTED FOR STOCK SALE—An extension of time until June 30, 1930, has been granted by the California Railroad Commission to the Sierra Pacific Power Company within which to complete the issuance and sale of $1,600,000 of first mortgage and refunding gold bonds heretofore authorized by the commission. The company, whose headquarters are in Reno, Nev., serves a small territory in California.

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WITHDRAWS STOCK SALE PETITION—Upon request of applicant, the California Railroad Commission has dismissed the application of San Joaquin Light & Power Corporation, Fresno, for authority to issue and sell $2,000,000 par value of its common capital stock to the Western Power Corporation and to use the proceeds to reimburse its treasury for capital expenditures and for the reduction of its floating debt.

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NORTHWEST DROUGHT AFFECTS EARNINGS—A reaction to the drought which harassed hydro-electric power generation in Seattle in recent weeks is shown in the Puget Sound Power & Light Company's earnings statement for November. While gross earnings of $1,474,928.16 in November, 1929, exceeded by $119,062.81 the gross earnings in November, 1928, operating expenses of $814,375.86 which amounted to $238,639.90 more than in November, 1928, helped to cut the November, 1929, net operating revenue to $531,219.03, as against $720,769.31 in the previous November. Extensive operation of the company's steam plants for generating electricity, together with increased purchase of power from other sources, resulted in the larger cost of operating during the recent drought, company executives explained. Gross earnings of $16,242,615.57 and net income of $7,237,122.84 were shown for the twelve months ended Nov. 30, 1929, as against $15,146,340.24 and $7,137,189.92, respectively, in the preceding twelve-month period.

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P. G. AND E. CO. TO ACQUIRE NOVATO UTILITY—Authority has been granted by the California Railroad Commission to the Pacific Gas and Electric Company to acquire and operate all the properties of the Novato Utilities Company, operating in Novato and vicinity, Marin County, the former company already having been authorized to purchase all of the outstanding capital stock of the latter company. The commission held, however, that if the purchaser pays more than $86,207.95 for the properties, less depreciation, and plus the cost of additions and betterments made since Nov. 30, 1929, it must charge such excess to miscellaneous debits to profit and loss.

Pacific Coast Electrical Association

Criddle Tells Engineers They Make Industry's Dreams Come True

CHARACTERIZING the electrical industry as still being a pioneering industry, E. B. Criddle, vice-president of The Southern Sierras Power Company and the Nevada-California Power Company, Riverside, Calif., and president of the P.C.E.A., delivered some inspiring remarks to the Engineering Section at its recent Los Angeles conclave. Mr. Criddle spoke at the general luncheon meeting that always is held in connection with the engineering meetings, and which this time took place at the Los Angeles Engineers' Club on Jan. 16.

Speaking emphatically of the value to the industry of the co-operative group meetings, Mr. Criddle urged the engineers to continue their good work and to make particular effort to carry back to their respective offices something of practical use to them and their companies. In this way, the speaker stated, may the executive officers of the participating companies be impressed with and convinced of the value of continuing to support employee participation in the section conclaves.

That the work of the engineers of the electrical industry is making possible the realization of many of the industry's dreams is commonly recognized, according to Mr. Criddle, who also pointed out the important fact that this of itself is increasing the operating burden of the public utility in carrying out its self-assumed burden of public service. Huge sums of money are required to be spent annually by the utilities in order to make their commodity, electrical energy, readily and dependably available for commercial, domestic, and industrial use. The fact that utility capital "turns over" only about once in five and one-half years, whereas the capital of other manufacturing concerns turns several times each year, requires the closest co-operation between the engineering, financial and sales departments in order that economic limitations may be met successfully.

An outline of the work of the various committees of the Engineering Section is given in the following brief reports from committee chairmen. All sessions

were well attended, more than a hundred being present at several of the meetings.

Accident Prevention Committee

J. R. ROWE,

Los Angeles Gas and Electric Corporation, Chairman.

Backed by the sound economics of "safety first" efforts and accident prevention work, the accident prevention committee is agressively carrying out its major job, that of education. A skit, entitled "Obstacles to Safety," was presented by this committee at a joint meeting with the overhead systems committee. This skit depicted a typical line gang during its noon hour and ended up with a demonstration of resuscitation upon the "tough guy" member of the gang who could be convinced of the worth-whileness of safety measures only after he had suffered an accident.

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Meter Committee

J. C. ABEL,

Pacific Gas and Electric Company, Chairman.

In two sessions of the meter committee, eleven different subjects were considered. These included education of metermen, meter statistics, new developments, applying 5-amp. meters to modern lighting installations, current transformer meters, operating problems of meter departments, problems in the testing of watt-hour meters, test facilities, indicating and recording meters in remote totalizing measurement, various relay tests, and several special tests and investigations.

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Hydraulic Power Committee

CLINTON DEWITT,

Pacific Gas and Electric Company, Chairman.

Eight study subjects occupied the committee's time during the conclave.

E. A. Crellin's report on automatic and regulatory safety devices as presented included information from only one operating company. This report is to be held open for further contributions that will enable the compilation of comparative information. In reporting upon the maintenance of hydraulic works, J. M. Gaylord gave an outline of typical conditions and economic considerations that are involved in the planning and handling of large maintenance jobs, including plant renewals. Specific methods that were followed out in connection with a recent plant renewal were presented.

On the subject of flow-line conduits, J. W. Jourdan gave a progress report. Mechanical reliability was not reported upon because 1929 plant statistics are not yet fully available. D. P. Dinapoli expects to present a completed report at the Fresno meetings later in the spring.

Considerable discussion was aroused upon the subject of automatic frequency control in hydro plants. In reporting upon the subject, L. F. Hunt called upon representatives of the Leeds & Northrup Company and the General Electric Company to outline the theory and equipment involved in their respective systems of control. In conclusion, Mr. Hunt made some very pertinent suggestions as to possible means of simplifying this class of equipment and improving its operating characteristics. Mr. Hunt's suggestions embodied the idea of accomplishing speed and load control by means of the automatic equipment operating directly through electrical devices instead of through governor fly-ball mechanisms as now is common practice.

A paper discussing the use of admixtures in concrete and their effects upon strength and permeability was presented on behalf of the subcommittee studying the use of concrete in hydraulic structures. In commenting upon current research and practice in hydro development, R. M. Peabody mentioned several subjects that have been submitted for study. These included a revision of the 1923 penstock report, full-sized tests on valve discharge, causes of and remedies for the decrease in discharge of power tunnels, effect of speed regulation on power plant equipment (supplementing a national report of several years ago), large-diameter thin-shell pipes and their supports, and P. G. and E. Co. experiments with the results of expansion in reinforced concrete flumes having various amounts of reinforcing and under various weather conditions. G. E. Decker gave an interesting description of methods employed in the straightening of the shaft of a large vertical waterwheel generator unit.

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Overhead Systems Committee

F. E. DELLINGER,

Los Angeles Gas and Electric Corporation, Chairman.

Following a brief report upon national group meetings given by the chairman, eight different subjects were considered.

Transformer loading studies as reported revealed the fact that heating due to short-time overloads of even a severe nature is not at all dangerous. Thus the conclusion was reached that less transformer capacity than has been customary may be used without danger of burn-outs. Studies of the National Electric Code and its comparison with General Order 64-A of the California Railroad Commission will be continued over into next year to enable suitable recommendations to be made to the national committee.

The chairman of the common-neutral subcommittee read the construction requirements of the California Railroad Commission as they pertain to common-neutral practice. Poles and preservative treatments were covered in a report on pole line structures and devices. Tests now under way will be reported upon later.

The subcommittee report on grounding methods brought forth considerable discussion concerning methods best suited to accurate ground resistance measurements and methods of attaching ground leads to rods or water pipes. Tests seem to indicate that the "ground Megger" or "Megohmer" produces results more dependable than the "three-point" method.

Data on the causes of interruptions on circuits of all voltages are being collected and tabulated by the operating records subcommittee with the hope that by knowing the prevalent causes of interruptions to service, they may be eliminated. From 27 to 50 per cent of all interruptions have been found to be classified as "unknown." This fact brought forth a plea for a more determined effort to ascertain the causes of troubles. Without knowing causes it is impossible to do an effective job of trouble elimination.

Full reports on conductor vibration and upon the corrosion of metals are expected for the Fresno meetings.

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Electrical Apparatus Committee

H. L. SAMPSON,

Southern California Edison Company, Chairman.

The chairman reported upon his attendance at the national group meetings in Pittsburgh last October, calling attention to the subjects handled, the methods of procedure and some of the more important items discussed. An interchange of minutes between the various geographic divisions has been inaugurated.

Concerning transformers and regulators, L. A. Buese reported full co-operation in his subcommittee and presented a summary of answers to a questionnaire sent out by him. The question of progressive acidity in insulating oils and the subject of oil leaks in oil-filled equipment aroused the greatest interest and discussion. New methods are being devised whereby leaks due to porous welds may be detected in factory tests.

E. R. Stauffacher reported for E. J. Crawford upon the subject of utilization equipment. Satisfactory conclusion of the work which has been carried on to obtain an agreement with manufacturers on fractional-horsepower motors has been reached. These will be available for all users and should be required by all utilities after June 1, 1930. Also, a decision was reached to agree to no more than 25 per cent increase in the allowable starting current in motors of more than 40 hp. instead of the 50-per-cent increase desired by manufacturers.

Control equipment and layout developments were summarized by C. E. Schnell. A wide divergence has been found in Pacific Coast practice in types and sizes of batteries and charging equipment, kinds of control wiring and methods of marking it, and in installation methods. The report indicates a definite possibility of a better and closer standardization.

A. P. Sessions reported upon various condenser troubles and methods of correcting them. G. E. Decker described troubles arising from magnetic particles in cooling air and the methods of combatting them. Letters from two Eastern companies giving their experience with hydrogen-filled condensers were read. W. R. Battey reported that one of these units has been ordered by the Southern California Edison Company. An illustrated description of a General Electric hydrogen unit was given by Mr. Gustaffson of that company.

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Prime Movers Committee

H. S. MARKEY,

Great Western Power Company of California, Chairman.

Preliminary reports from the subcommittees on review, heat balance, and maintenance were presented. Lively discussion ensued, particularly upon the subjects covered by the review report. It was the consensus of opinion that the work of the review subcommittee was very useful.

Time available did not permit the presentation of a report from the turbo-generator equipment subcommittee. A report from the subcommittee on boiler and condenser water presented illuminating facts and aroused some discussion. This also was true of the report upon automatic control equipment.

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Inductive Co-Ordination Committee

H. S. LANE,

Pacific Gas and Electric Company, Chairman.

The program of the meeting followed the committee's program for the year, including reports upon and discussions of the subjects assigned to the four subcommittees.

Concerning inductive co-ordination, J. O. Binney reported upon an investigation of a recent case of paralleling between exchange and toll circuits and 16-kv. and 4-kv. power circuits. No recent information was reported concerning the activities of the national inductive co-ordination committee nor of the national joint development and research committee.

In the absence of H. N. Kalb, the chairman guided the discussion concerning the subject of power company communicating systems. Many problems peculiar to the power compaines' circuits were included, particularly the matters of signaling and protective equipment, cable installations and problems incident to construction of communication circuits under high-tension lines.

A report presented by C. C. Campbell covering radio co-ordination and complaints outlined contemporary methods of handling radio complaints and the equipment used, gave a complaint classification and touched upon local and state laws. Following a general discussion of specific cases, Mr. Walters, manager of the Radio Trades Association of Southern California, outlined the operations of that organization, stressed the beneficial results obtained from the educational course for radio troublemen, and expressed appreciation of the high degree of support given by the utilities.

L. J. Corbett, in reporting upon the present status of the investigation of the common primary and secondary neutral, stated that in certain of the test areas the trial installations are in complete operation and that some definite tests have been made. Discussion resulting stressed the fact that the salient points to be considered in this connection are the actual effects as to noise resulting from the cut-over, the costs and economies involved, and the necessity of obtaining definite data concerning these two points. A report must be submitted to the California Railroad Commission prior to July 1, 1930, and facts accruing from the trial installations must be obtained before that date to enable the commission en-

gineers properly to study the actual situation. Representatives of the telephone companies reported progress in making these tests and indicated a desire to effect close working contacts with the power company organizations to facilitate the consideration of such problems as may arise.

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Underground Systems Committee

R. P. LUTZI,

Pacific Gas and Electric Company, Chairman.

Problems of national as well as of local interest were made the subject of study by the underground systems committee. In discussing leaded versus non-leaded cables, Z. T. Pettit pointed out that among the peculiar advantages of non-leaded cable were the elimination of sheath currents, 25 per cent reduction in cost, elimination of electrolysis and a lower cost of splicing. The major factors favoring the leaded cable are that its use results in a permanent installation, its maintenance costs are low, and that with it a fully waterproof job is possible.

The total installed cost of incandescent lighting transformers to serve street lights will be greater than the cost involved where compensator units are used, according to a report presented by C. G. Mansfield. The relation between this extra cost and the importance attached to the elimination of high-voltage conductors from ornamental street lighting standards will largely determine which equipment will be used in any given job. The installation of a 20-amp. system of street lighting as compared with the older 6.6-amp. and 15-amp. systems was described in a report by H. H. Buell. Advantages favoring the 20-amp. systems as mentioned were operation on lower voltage with resultant lower cable costs, elimination of the double transformation required with the older systems with resulant lowered first cost, operation at a better power factor than the other systems, and a reduction in the likelihood of radio interference. Against these advantages stands the fact that the operating losses are greater in the 20-amp. system. No definite recommendations were made because more operating experience is desired, upon which to base such recommendations.

In reporting upon the results of leaving subway equipment indefinitely submerged, C. E. Biggs stated that present general practice on the Pacific Coast is to prevent immersion as far as possible and to correct such conditions as promptly as possible. Practically all underground equipment is designed to withstand immersion, but the price of service reliability is closer supervision of all equipment with particular regard to joints and gaskets. Corrosion was given as perhaps the worst result of submersion, and it was believed that partial submersion was worse than complete submersion.

The "Underground Systems Reference Book" soon will be in print, according to the chairman, who also reported upon the fall meetings of the national underground systems committee in Pittsburgh. In discussing the methods of locating cable faults, a paper prepared by Mr. Cullen and presented by Mr. Lutzi classified fault-finding methods under four heads. These were direct inspection of equipment, the cut-and-try method, the use of testing sets to determine the theoretical location of the fault, and the use of equipment which leads the tester direct to the fault.

Present practices in giving standby service were outlined by C. H. Jenkins. Pacific Coast practice is to give such service to institutions such as hospitals, theaters, department stores, office buildings, electric railways and industries where an interruption of electric service entails loss or damage in processes. The cost of standby service for the ordinary light or power consumer is not warranted, according to the report.

Tests to determine the effects of sheath currents upon the accuracy of current readings taken on large single-conductor lead-covered cables by means of split-core current transformers were discussed by E. R. Stauffacher. These tests showed definitely that the presence of such stray currents injures the accuracy of readings so taken. The development of adequate shunts to be used to bypass sheath currents around split-core transformers will improve the accuracy of test readings, but the only known reliable method is to take such readings where the sheath is broken by an insulating joint.

Commercial Section Conclave Plans March "Convention" at Fresno

"WHAT will business be like in 1930?" might well have been the keynote of the Commercial Section conclave of the P.C.E.A. at the Fairmont Hotel, San Francisco, Jan. 16 and 17. It was H. M. Crawford, general commercial manager of the P. G. and E., who, in an impromptu speech shortly after the meeting was opened by Section Chairman George Bigelow, made the keynote talk. Reciting the results of the symposium on this subject held recently at a sales managers' association meeting, Mr. Crawford said that 1930 would demand:

1. Higher efficiency in sales work. This means greater technical knowledge of business and better selection and training of personnel.
2. Concentration on the most profitable activity.
3. Compensation of salesmen adjusted so as to hold good men and keep them interested.
4. Improved supervision of salesmen in the field so that they will make friends as well as obtain revenue.
5. A more understanding co-operation with dealers so that all the aid possible from them can be obtained. Employees also must be sold.

George Sullivan, of the Portland Electric Power Company, was a visitor from the Northwest Electric Light & Power Association. He made a short talk along similar lines and invited P.C.E.A. members to attend his section's conclave in Spokane, Feb. 14 to 16.

Ernest Greenwood, director of commercial activities of the N.E.L.A., in showing that this year and in the years to come a greater return in sales per dollar of investment is necessary, made a significant statement.

"During the next five years we will note a marked accelerated trend toward electricity for cooking. In fact, all domestic service, with the exception of the main house heating plant, will be supplied through electrical energy. The idea of your highly developed electric range load west of the Rockies is wending its way eastward. I venture the opinion that more revenue can be obtained for the combination company if the cooking load is gradually turned to electricity rather than gas. This is particularly true in the natural gas districts." He reviewed all the activities of the N.E.L.A. in commercial development and declared himself as favoring more spectacular commercial events such as the food preservation and Light's Golden Jubilee activities of the past year.

Dr. A. C. White, chairman of the national committee on the relation of electricity to agriculture, was also a visitor. He, too, made a significant statement. After showing the broadness of the application of electricity to agriculture, he asked the commercial men whether they were ready to decide a very important issue, namely whether they were going to equip themselves to merchandise all of the equipment which it takes to electrify the farm or whether they are to develop dealer co-operation on a higher scale. The dealer is not a new idea developer, he said, so that the burden for the pioneering and development of this business depends upon the light and power company.

The luncheon meeting was entertained by the presentation of a market analysis prepared for the P. G. and E. by W. P. Bear of that company.

Bureau reports were heard at Saturday's luncheon meeting.

Myron McNeal, chairman, Merchandising Bureau, reported his committee working on and recommending (1) the group contract idea for the sale of appliances, (2) rehabilitation of appliances and survey of their use in homes, (3) direct-mail stuffers for bills.

The refrigeration committee is working on (1) co-operation with distributors and follow-up of the National Food Preservation Program, (2) group purchase for employees, (3) greater employee ownership of refrigerators.

The air heating committee is reporting and studying (1) remote control and automatic temperature control equipment, (2) house insulation, (3) apartment house electrification with respect to economies as the size of the apartment house increases.

The commercial cooking committee reported its work along the lines of (1) gathering of photos and data on installations, (2) obtaining more publicity in trade publications, (3) publicity activities in local communities through bureau members, (4) sales distribution of data obtained.

The range committee reported itself working along the lines of (1) preparation of an educational booklet and lectures on cooking, (2) employee range sales with a 1,000-range bogey for this year, (3) interchange of merchandising ideas, (4) a revision of the water heating manual.

E. G. Stahl, chairman of the power bureau, reported for the agricultural power committee the study of distribution of farm equipment along the lines discussed by Dr. White.

Industrial heating committee activities are (1) to advertise industrial heating more extensively, and (2) to provide the means for locating the national industrial heating school in Los Angeles before the N.E.L.A. convention. W. R. Chauner reported on competitive power, and modifications and additions to the agricultural power handbook were outlined.

Reporting for the general bureau, Dan Scott outlined the essay contest to be held this year on the subject of home lighting.

At the afternoon general session George Tenney, chairman of the Advertising-Publicity Section, with which the Commercial Section held a joint meeting, presided. The first speaker was Morris Roles with a talk on the subject, "Is the Salesman Always Wrong?" He ended with a strong series of questions which sales managers should ask themselves in respect to their relations with salesmen. This list of questions will be published later in full.

The Lighting Bureau report was then given by Frank Bevan, who took issue strongly with the general lassitude toward lighting as expressed in one report—"Of course you have the lighting anyhow." He pointed out that power companies will "turn the building upside down" to sell a range for $200 which brings in a $30 or $40 revenue when a 60-watt lamp is worth $3 a year and a carton of 60-watt lamps which sells for $1.20, will bring in $18 a year revenue. A general review of the activities of the Bureau followed, ending with a presentation on behalf of Clark Baker, chairman of the educational committee, and given in his absence by Victor Hartley. This was a proposal to use the waste space at the top of show windows in order to mount higher intensity window lighting units at a greater distance from merchandise in the windows and to provide for more ventilation. Pictures of artistic possibilities with this sort of window were shown.

A. V. Guillou, assistant chief engineer, California Railroad Commission, next drew a picture of the similarity of

interests between the regulatory commission and the commercial department.

He pointed the similarity as being (1) interested in the good standing of the company and (2) obtaining of rates as low as possible in order to help sales and to increase the growth of the company. He drew a parallel as to the factors which affect the standing of either an individual or company. The factors which make a man well liked, he said, are: (1) Courtesy. "Courtesy is the butter on the bread of square dealing and service," he said. "We cannot make a diet of butter alone and bread without butter is pretty dry eating." (2) Prompt payments. He urged prompt payment of small local bills. "See that these are paid as promptly as your bills are required to be paid to those whom you owe." (3) Treating customers fairly but treating everyone fairly whether business is done with him or not. (4) Conversation. "Fortunately, the utilities are passing beyond the era of big construction programs," he said, and showed how conflicting statements in the financial pages and in news stories led to misunderstandings on the part of the public. He next went into the matter of rate making and the joint responsibility of the commercial man and the regulatory body in this matter. He ended by saying: "No department of a utility is so injured by improper regulation or so helped by proper regulation as is the commercial department."

The next conclave was announced for March 20-21, and will be held in Fresno. Inasmuch as the P.C.E.A. holds no convention of its own this year but joins with the N.E.L.A., it is planned to make the March conclave the commercial department convention of this year.

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Purchasing-Stores Section Studies Economies

Methods of simplifying procedure and ways and means of eliminating unnecessary and expensive details of accounting were discussed with much interest when the Purchasing and Stores Section, P. C. E. A., met in the club rooms of the Southern California Edison Company, Los Angeles, on Jan. 16 and 17, with the largest attendance in the history of the section.

It was generally agreed by those present that there was great room for improvement along the lines discussed, it being brought to light that certain elaborations have been built up permitting great accuracy of accounting, the value of which is questionable when considered from the standpoint of the expense involved.

Favorable progress was reported in connection with the simplification and standardization of pole line hardware. The Purchasing and Stores Section has completed a study of the situation and is working together with the Engineering Section, the California State Chamber of Commerce and the United States Department of Commerce in order to help produce economies which will benefit manufacturers, distributors and the public generally. Special meetings have been held with the California State Chamber of Commerce simplified practice committee and with the Engineering Section, P.C.E.A.

The afternoon session on Jan. 16 was addressed by E. B. Criddle, president of the association, who urged the members of the section present to carry home and put to work the information gathered at the meetings.

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Ad-Publicity Men Consider Lighting Campaign

Discussion of a suggested program of domestic lighting advertising in conjunction with the Lighting Bureau of the Commercial Section featured the meeting of the Advertising-Publicity Section, P.C.E.A., in San Francisco Jan. 10.

Walter Carlson, chairman of the domestic lighting committee, presented an advertising program which had been planned by Barton, Batten, Durstine & Osborn, of New York, for the three Mazda lamp manufacturers. Advertising men of the California power companies informed the lighting men in the discussion which followed that the proposed program was too extensive to be used in its entirety by the central stations in this territory, but that portions of the campaign might be used.

Through the courtesy of the General Electric Company, Bruce Barton, noted advertising expert, addressed the meeting on the general subject of advertising through the medium of the photophone.

The next meeting of the Advertising-Publicity Section will be held in Fresno in joint session with the Commercial Section on March 20-21, 1930.

Northwest Electric Light & Power Association

Commercial Section Prepares Program for Mid-Winter Conference at Spokane

THE tentative program for the fifth annual mid-winter conference of the Commercial Section of the Northwest Electric Light and Power Association to be held at Spokane, Wash., Feb. 13-15, 1930, contemplates discussion on the work of thirteen committees and contains addresses on special subjects by Marshall E. Sampsell, chairman Commercial National Section; F. E. Price, project supervisor, Oregon C.R.E.A.; L. W. Going, chief electrical inspector, Portland; and Roy C. Kenney, manager NePage-McKenny, Portland. An interesting program is promised.

Headquarters for the meeting have been arranged at the Davenport Hotel, which has agreed to take care of all out-of-town guests desiring to attend. Reservations should be made direct with the hotel, which will confirm these reservations as fast as they are received.

J. F. Orr, chairman of the section, and his associates in charge of the program and arrangements especially invite manufacturers' representatives and jobbers and all those interested in the commercial development of the industry to be present.

A detailed program follows:

Thursday, Feb. 13, 9:30 a.m.

Welcome—M. W. Birkett, Spokane, vice-president of the association.
Response—M. L. Hibbard, Boise, president of the association.
Power Bureau—J. D. Scott, chairman, Portland.
Commercial Cooking Committee—A. B. Chambers, chairman, Portland.
Industrial Heating Committee—Thomas M. Gibbes, chairman, Seattle.
Power Committee—J. C. Thompson, chairman, Medford, Ore.

Thursday, Feb. 13, 1:30 p.m.

Merchandising Bureau—R. M. Bleak, chairman, Salt Lake City.
Domestic Range Committee—Glenn L. Jackson, chairman, Medford, Ore.
Domestic Refrigeration Committee—James B. Buman, chairman, Portland.
Water Heating Committee—L. W. Brainard, chairman, Boise, Idaho.
General Merchandising Committee—H. W. Cooper, chairman, Lewiston, Idaho.
Promotional Rates Committee—H. G. Kelsey, chairman, Aberdeen, Wash.

Friday, Feb. 14, 9:30 a.m.

Address—Marshall E. Sampsell, chairman, Commercial National Section, Chicago.
Lighting Bureau—T. W. Fitch, chairman, Portland.
Industrial and Commercial Lighting Committee—L. D. Johnson, chairman, Portland.
Home Educational Committee—T. W. Fitch, chairman, Portland.
Electrical Advertising Committee—H. C. McDaniel, chairman, Walla Walla, Wash.
State and Highway Lighting Committee—G. L. Corey, chairman, The Dalles, Ore.

Friday, Feb. 14, 1:30 p.m.

Address—Farm Electrification, by F. E. Price, project supervisor, Oregon C.R.E.A.
Rural Electrification Committee—George Hibbert, chairman, Toppenish, Wash.

Saturday, Feb. 15, 9:30 a.m.

Address—L. W. Going, chief electrical inspector, Portland.
Address—"Contractor-Dealer Co-operation," by Roy Kenney, manager, NePage-McKenny, Portland.

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"At Home" for Townspeople Held by Women Employees

Members of women's committees of the Puget Sound Power & Light Company at the Wenatchee and Chehalis (Wash.) district offices of the company played host to the citizens in their respective communities at Christmas time by holding an "at home" at the company salesroom in each district in the form of a pre-Christmas appliance demonstration.

More than 2,000 persons were entertained by the nine women who compose

the Wenatchee women's committee, and 250 guests attended by invitation the "open house" held by the Chehalis women, whose committee numbers 25 members.

No actual selling was done at either demonstration, but each guest received a ticket entitling him to a chance on an electrical appliance. Frozen dainties and iced punch were served from electric refrigerators, waffle irons dispensed crispy waffles, and hot coffee and toast were provided by electric percolators and toasters. Possibly the most popular of all were the products of the electric cooker pots—a roast and four vegetables being served at Wenatchee and baked beans and brown bread at Chehalis.

Miss Blanche Tarbert, chairman, and Miss Virginia Shay, secretary, of the Wenatchee women's committee, were hostesses-in-chief at Wenatchee's "reception," and the committee in charge of the Chehalis demonstration consisted of the Misses Marie Knizek, chairman, Rosemary Nacht and Lois Anderson. L. R. Coffin, manager, and L. M. Shreve, sales manager, Puget Sound Power & Light Company, Wenatchee, and A. M. Chitty, manager, and G. W. Barber, sales manager of the company at Chehalis, co-operated closely with the women's committees in their respective towns in making the Christmas appliance demonstrations a pronounced succeses.

Meetings

Gus Forsberg President of Utah Electrical League

Gus W. Forsberg, manager of the Wasatch Electric Company, Salt Lake City, has been elected president of the Electrical League of Utah for the ensuing year.

Committees of the league to serve for the year have been named as follows:

Budget—Gus W. Forsberg; B. C. J. Wheatlake, General Electric Company; M. L. Cummings, Jr., Utah Power & Light Company.

Ordinance—W. A. Moser, Westinghouse Electric & Manufacturing Company, chairman; George R. Randall, Salt Lake Electric Supply Company; C. L. Felt, Felt Electric Company; W. M. Scott, Utah Power & Light Company; F. D. Winegar, city electrical inspector; J. H. Roberts, Board of Fire Underwriters.

Advertising and Publicity—M. L. Cummings, Jr., chairman; R. M. Bleak, Utah Power & Light Company; G. J. Guiver, Holding Electric Company.

Entertainment — J. M. Perlewitz, Graybar Electric Company, chairman; R. J. Ramsey, General Electric Supply Corporation; R. P. Maybee, Maybee & Shipley, electrical contractors; Blaine Grey, Blaine Grey Electric Company; W. W. Crocheron, Inter-Mountain Electric Company.

Auditing—S. W. Leaver, Inter-Mountain Electric Company; R. C. Nash, General Electric Supply Corporation.

Program and Activities—C. A. Wolfrom, Utah Power & Light Company, chairman; W. J. Berryman, Mine & Smelter Supply Company; G. B. McKee, Salt Lake Hardware Company; Frank

GUS W. FORSBERG

Edwards, Frank Edwards, Inc.; S. C. Cook, electrical contractor; F. H. Eardley, electrical contractor; Gayle Smith, Mountain States Telephone & Telegraph Company.

Membership — Leo Brandenburger, manufacturer's representative, chairman; George B. Earl, Utah Power & Light Company; R. R. Reid, Reid Electric Company; H. R. Bygel, United Electric Supply Company.

Lighting Service Bureau—E. A. Evans, Westinghouse Lamp Company, chairman; E. L. Dee, Edison Lamp Works, General Electric Company; T. J. Stevens, Stevens Sales Company; L. B. Gawan, Utah Power & Light Company; J. C. Jacobs, Apex Electric Company.

Coming Events

American Institute of Electrical Engineers, Pacific Coast Division—Annual convention, Portland, Sept. 2-5, 1930.

International Association of Electrical Inspectors, Southwestern Section—Annual convention, Hotel Leopold, Bellingham, Wash., Aug. 25-27, 1930.

National Electric Light Association—Fifty-third convention, San Francisco, June 16-20, 1930.

Pacific Coast Electrical Association—Joint convention with National Electric Light Association, San Francisco, June 16-20, 1930.

Advertising - Publicity Section joint meeting with Commercial Section, San Joaquin Light & Power Corporation Building, Fresno, March 20-21, 1930.

Commercial Section meeting, San Joaquin Light & Power Corporation Building, Fresno, March 20-21, 1930.

Northwest Electric Light and Power Association—Accounting Section meeting, Portland, March 17-18, 1930.

Commercial Section meeting, Davenport Hotel, Spokane, Feb. 13-15, 1930.

Engineering Section meeting, Aberdeen, Wash., March 26-28, 1930.

PREPARE FOR WESTERN METAL CONGRESS—Plans for the second Western Metal Congress and Western States Metal and Machinery Exposition, which will be held in the San Francisco Bay region about the middle of February, 1931, already are being made. A meeting was held in San Francisco Jan. 10 attended by chairmen and secretaries of the San Francisco units of the following associations: American Society for Steel Treating, American Society of Mining and Metallurgical Engineers, American Welding Society, American Institute of Electrical Engineers, Pacific Coast Gas Association, American Society of Mechanical Engineers, and the Society of Automotive Engineers. H. S. Taylor, of the Mechanical Engineering Department, Stanford University, Palo Alto, Calif., has been named program chairman.

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THE SOUTHEAST ELECTRIC CLUB of Huntington Park, Calif., and adjacent territory, held its second Ladies' Nite and dinner dance at the Ebell Club, Huntington Park, in December. Prizes were given for various events, such as cards and dancing, by jobbers and manufacturers. The awarding of the trophy for the most Red Seal homes, presented by the Associated Wholesale Electric Company, was made by George Rankin, of the California Electrical Bureau. The committee in charge consisted of Louis J. Meller, president; A. L. Pryor, secretary-treasurer; Harper Brothers and Hammon Electric Companies.

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SAN DIEGO ENGINEERS' CLUB ELECTS OFFICERS—At the recent annual meeting of the Engineers' Club of San Diego, Calif., new officers were elected for the ensuing term as follows: President—W. H. Talbott, superintendent, electric meter department, San Diego Consolidated Gas & Electric Company; vice-president—R. D. Watts, assistant engineer, Bureau of Water Development, City of San Diego; treasurer—E. H. Smith, manager, American Concrete Pipe Company; secretary—R. E. Jenson, consulting engineer. The directors are: E. L. Freeland, Z. Rungie, J. R. Haylor, R. V. Dodge, Jr., and C. B. Ireland. Mr. Freeland is the retiring president.

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SAN FRANCISCO LEAGUE MEMBERS HEAR "THERAMIN"—The first Pacific Coast exhibition and demonstration of the radio-musical instrument, the "Theramin," was held on Jan. 6 at the first meeting of the year of the San Francisco Electrical Development League before 354 members of the electrical and radio industries. Don Gilman, of the National Broadcasting Company, explained the device, which was demonstrated by Max Dolin with accompaniment by a 24-piece N.B.C. orchestra.

Personals

State Gas Administrator To Head Electrical Division

CLAUDE C. BROWN, who has been acting as natural gas administrator for California since July, 1927, has been appointed gas and electric engineer by the Cailfornia Railroad Commission to succeed Charles Grunsky, resigned. Mr. Brown will be head of the

CLAUDE C. BROWN

gas and electric division of the commission's engineering department, and in addition will continue for the present to act as natural gas administrator.

Mr. Brown has been connected with the engineering activities of the commission since November, 1922, when he was appointed assistant valuation engineer. In 1923 he was appointed gas engineer for the commission, with headquarters in Los Angeles. Because of his thorough grasp of the natural gas situation he was appointed natural gas administrator in July, 1927, under an agreement between the companies in the Los Angeles area, and exercised control of the allocation, distribution and utilization of natural gas in that area with marked success. Since the inception of the plan to bring natural gas to the San Francisco Bay area he has been devoting a major portion of his time to the problems involving rates and service of the natural product in the Bay area.

Mr. Brown is a graduate of the University of California Engineering School, having received his degree of Bachelor or Science in electrical and mechanical engineering in 1914. Prior to his affiliation with the commission he was engaged in engineering work for the J. G. White Engineering Company of New York, the Pacific Gas and Electric Company, Southern California Edison Company, Northern California Power Company, Pacific Power & Light Company, Southern Pacific Company and Pacific Mail Steamship Company. He is a member of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Petroleum Institute.

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C. E. Grunsky Is President of Engineering Council

AN HONOR of the highest order has been conferred upon Carl Ewald Grunsky with his appointment last month as president of the American Engineering Council, an organization composed of representatives of all the major engineering bodies of the country.

Mr. Grunsky, who heads a firm of consulting engineers in San Francisco, is a past president of the American Society of Civil Engineers; he was a member of the first Panama Canal Commission, and during the administration of President Taft served as

C. E. GRUNSKY

consulting engineer to the Secretary of the Interior. He was at one time consulting engineer of the United States Reclamation Service and is a former city engineer of San Francisco.

At the present time Mr. Grunsky is on a tour of the Orient following his attendance as a delegate at the World Engineering Congress held in Tokyo in October.

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WILLIAM L. GOODWIN, formerly operating vice-president of The Society for Electrical Development, New York, and for the past three years president, Goodwin, Morton and Badrian, Inc., merchandising counselors of New York, has been elected president of The Armstrong Electric & Manufacturing Corporation, Huntington, W. Va. Mr. Goodwin's business career began in California 30 years ago, where he developed a large electrical jobbing concern with headquarters in San Francisco.

C. L. Seavey Now Railroad Commission President

CLYDE L. SEAVEY has been elected president of the California Railroad Commission for 1930, in conformity with the policy followed by the commission in recent years of rotating the presidency among its members for a one-year term. He succeeds Thomas S. Louttit, who served as the presiding officer of the commission during 1929.

Mr. Seavey has served on the commission since Jan. 1, 1923, and was reappointed by Gov. C. C. Young on Jan. 1, 1929. Prior to his appointment to the Railroad Commission, he served as city manager of Sacramento, Calif.

CLYDE L. SEAVEY

Before taking up the duties of the Sacramento city managership, he had been connected with the state government for many years as a member of the State Board of Examiners, the State Board of Control, the State Tax Commission, the State Civil Service Commission and in other special capacities of importance. In 1923 and 1924 Mr. Seavey also served as president of the California Railroad Commission.

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C. E. PLUMMER is the new superintendent of power distribution of the Turlock (Calif.) Irrigation District, succeeding R. W. Shoemaker, who resigned some time ago to accept a position in Rio de Janeiro with Electric Bond and Share Company interests. The operation of the Turlock and Modesto Irrigation Districts' hydroelectric plants, Don Pedro and La Grange on the Tuolumne River, is under the direction of R. V. Meikle, chief engineer of the Turlock Irrigation District. L. H. Parker is assistant engineer.

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WALTER J. WALSH, formerly industrial engineer of the Great Western Power Company of California in the San Francisco district, has announced the opening of an office for the general practice of law at 723 Hearst Building, San Francisco.

District Development Work Assigned to Engineer

RALPH G. HUBBARD, staff engineer of the Public Service Company of Colorado, Denver, has been appointed Cities Service Industrial Development Commissioner for the area covered by his organization in Colorado and Wyoming. Mr. Hubbard's work will be to survey natural resources, sites for manufacturing and industrial enterprises and general marketing conditions, with a view to placing the advantages of the district before large power users who may be seeking new locations in which to operate.

Mr. Hubbard is the first full-time expert to be assigned to permanent duty in a designated field by the industrial development department of the Public Service company. He joined the company in 1913 as an apprentice engineer, and since 1922 he has been a

RALPH G. HUBBARD

member of the engineering staff, making his headquarters at Boulder, Colo., until September, 1929, when he was transferred to the Denver office of the company.

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Joins Pacific Power & Lt. Co. as Agricultural Agent

DARYL B. LEONARD, for the past five years county agricultural agent of Cowlitz County, Wash., has recently been appointed to the newly created position of agricultural agent for the Pacific Power & Light Company, Portland, with headquarters at Walla Walla, Wash.

Mr. Leonard's experience in agricultural work and his understanding of farm conditions in the Northwest qualify him to render valuable service to farmers in the territory served by the Pacific Power & Light Company. He is a graduate of Washington State College, he has specialized in the study of truck farming and livestock breeding, and at one time he operated a small truck farm in western Washington.

Following his academic work at the state college, Mr. Leonard was given a temporary appointment with the Bureau of Plant Industry of the U. S. Department of Agriculture. Later he was employed by the extension division of the University of Idaho as county club

DARYL B. LEONARD

agent in southern Idaho, and subsequently he accepted the appointment as agricultural agent in Cowlitz County, Wash. He has been active in 4-H Club work for the past seven years.

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J. H. WARDEN, sales manager, El Paso Electric Company, El Paso, Texas, won first prize for sales managers in his district in a recent contest held by the Kelvinator Corporation. Given his choice, Mr. Warden selected a shotgun. This individual prize is in addition to a gold cup which the Kelvinator Corporation in the same contest presented to the company's sales department.

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JAMES R. KEARNEY, president, James R. Kearney Corporation, St. Louis, Mo., recently paid a brief visit to the Pacific Coast. Arriving in Los Angeles, he was accompanied to San Francisco by H. F. Hartzell, of Maydwell & Hartzell, Inc., Pacific Coast representatives of the Kearney corporation. The trip was in the interest of several new items of electrical equipment which were shown and demonstrated in the cities visited.

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RICHARD B. CARR, manager, heavy products department, U. S. Steel Products Company, San Francisco, Calif., has resigned from that position and has announced his intention of retiring from business activities. Mr. Carr is well known throughout the Pacific Coast territory where he has been identified with the steel company for more than 25 years.

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GEORGE A. DETHLEFSEN has established himself in Hollister, Calif., under the name of the Service Electric Company, and is carrying on a general electrical contracting, merchandising and radio business.

LESLIE B. JOOST, formerly associated with the Pacific Gas and Electric Company, has been appointed radio interference investigator in the East San Francisco Bay territory for the Pacific Radio Trade Association, relieving Mr. Borch so that he may devote his entire time to the San Francisco territory. Mr. Joost has had several years' experience with radio interference in connection with the Pacific Gas and Electric Company. More than 350 complaints are received each month by the Pacific Radio Trade Association, according to George H. Curtiss, secretary.

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RALPH R. WOOLLEY, hydraulic engineer for the United States Geological Survey, with headquarters at Salt Lake City, has been named a member of a board appointed by the Federal Power Commission to examine the properties of the Idaho Power Company. Mr. Woolley expects to begin the examination the early part of February.

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FRANK H. BROOKS has been appointed by Mayor Walter as a member of the Water and Power Commission of the City of Los Angeles to succeed John R. Richards, who resigned recently. Mr. Brooks' appointment has been confirmed by the Los Angeles City Council by a vote of 8 to 7.

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O. R. EVANS, who has been district superintendent in the Pacific Gas and Electric Company's North Bay Division, with headquarters in Santa Rosa, Calif., has been transferred to the San Joaquin Division as division superintendent, succeeding J. H. Fagg.

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DONALD K. LIPPINCOTT, formerly associated with Charles S. Evans, patent attorney of San Francisco, has gone into business for himself in that city as a patent attorney and consulting engineer with offices in the Mechanics Institute Building, 57 Post St.

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GEORGE RANKIN, for the past seven years in charge of the Los Angeles office of the California Electrical Bureau, has joined the Southern California Edison Company's organization and will have charge of its lighting sales.

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BURTON Y. GIBSON, formerly associated with Wesix, Inc., San Francisco, has joined the sales staff in that city of Listenwalter & Gough, Inc., distributors of electric supplies and equipment.

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J. B. CAMPBELL, Morton, Wash., owner of the electric light and power plant in that city, has sold his holdings to the Western Gas & Electric Company. He will continue as general manager of the business.

Contractors, Dealers and Inspectors

Bakersfield Association Solves the Problem

Solved is the problem of attendance at meetings of a local association. The Bakersfield Electragists have found the solution. Meeting every Tuesday night, this branch of the Electragists has 100 per cent attendance. The meeting is called at 7:30 and on the same evening all the ladies assemble at one of the member's homes for bridge. Naturally the men dispose of their business as quickly as possible and adjourn to the scene of the bridge party where they organize their own card game and spend a pleasant social evening together.

The result has been astounding, according to the Electragist executive secretary, Frank Connolly. Formerly it was hard to get a quorum but now the attendance is 100 per cent. The friendship and confidence that have been established as a result of these meetings have almost entirely eliminated difficulties which existed through misunderstandings in the past.

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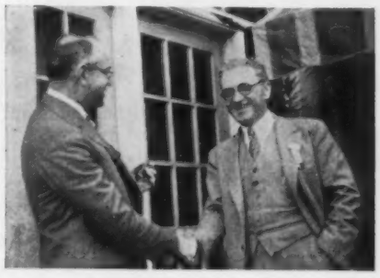
Congratulations or Condolences



Eddie Martin transferred the reins of office for the Northern Chapter to Walter Vance, shown respectively left and right. Mr. Vance becomes vice-president and the chairman of the Northern Chapter

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PFEIFFER ELECTRIC COMPANY, V. V. Pfeiffer, proprietor, has opened at 1165 Lincoln Ave., San Jose, Calif., where a general electrical contracting, appliance and radio business is conducted.

△

AN IMPORTANT EXPANSION in its business lines to include all kinds of household electrical appliances is announced by the Moulton Electric Company, Ltd, 704 Columbia St., New Westminster, B. C. For the past 20 years the Moulton firm has specialized in electric light fixtures and installation contracts. The firm also has a well fitted up fixture showroom and retail store. The new lines now to be handled include vacuum cleaners, refrigerators, radio sets, washers and electric ranges. S. A. Moulton is the founder of the firm and H. R. Moulton, has son, has now joined him in the business. Used appliances will be accepted as part payment, it is announced, while a radio and electrical appliance service department will also be established.

▲

Long Beach Dealers Light City Tree

Long Beach Electragists made history during the recent holiday season. On the lawn of the Chamber of Commerce Building, in Long Beach, the Chamber erected a 20-ft. Christmas tree and supplied the current for illumination. Members of the Electragists' association supplied strings of lights to the extent that 300 lamps were used to decorate the tree. Members of the committee from the Electragists did the decorating. The tree was kept lighted from Dec. 23 to Jan. 2.

The Long Beach Electragists decorated a 20-ft. cedar tree with 300 lamps. In the picture are Fred A. White, executive secretary of the Long Beach Electragists, Joe Lane, chairman, Christmas tree committee, and R. W. Abright

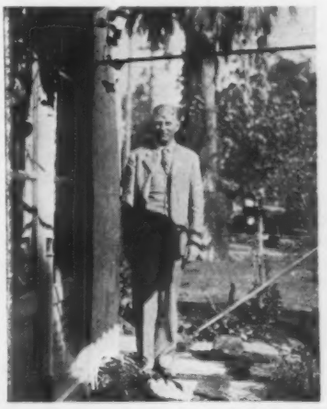
The effect of all the lighting was not as glaring as might be supposed. Set back perhaps 40 ft. from the sidewalk from the middle of the street the lights seemed to blend into a mass of shimmering color. The effect was particularly beautiful late in the evening when the fog from the bay cast a haze over the entire tree.

One of the outgrowths of this work was that the secretary of the Chamber of Commerce without solicitation announced that next year the Chamber would buy the largest silver tipped fir it could find and have the Electragists light it again.

The committee in charge of the decorating consisted of Joe Lane, R. W. Abright and C. Jensen.

▲

Not a Moving Picture



Art Ogilvie, himself in person, not among the palms of Santa Monica, his home, but among the palms of Bakersfield at the recent California Electragists' convention

△

A STUDY INTO THE COSTS OF THE plumbing business is to be undertaken by the Rsearch Bureau of the School of Business Administration of the Oregon Agricultural College at Eugene, according to a recent announcement. A. L. Williamson, plumber and former mayor of Eugene, was the originator of the idea. The research is to be started in Eugene and extended to Marshfield, Cottage Grove, Roseburg, Albany and Corvallis. A similar study of electrical costs would prove of value to the electrical industry.

△

W. M. BENNETT of the Bennett Electric Company, Vancouver, B. C., is about to open a new and thoroughly modern electrical store at 2950 West Broadway. Mr. Bennett has established during past years a very extensive electrical business in the contracting field, and has his headquarters at 1516 Comox St. He will retain this business, but will also enter the merchandising field with a full line of electric appliances and accessories.

R. H. KENNEDY has opened The Burnaby Electrical Supply at 4014 Kingsway, Burnaby, B. C. The firm will handle all classes of electrical appliances, radio sets, and electrical wiring and installation work.

△

GEORGE GROVER, San Diego electrical contractor, announces the opening of an up-to-date electric appliance store at 3975 Cleveland Ave., San Diego, Calif. Mr. Grover is an enthusiastic supporter of the Red Seal plan and his business card bears these classifications of activity: "Wiring, Fixtures, Motors, Heating, Ranges."

△

WALLACE ELECTRIC COMPANY has opened a retail store in Vancouver, B. C. This firm has carried on a large electrical contracting business in Vancouver for the past ten years and in addition to expanding this business, it will in future also operate a retail store. The firm is headed by R. G. and J. G. Wallace, and the store is located in the downtown area at 427 Seymour St.

△

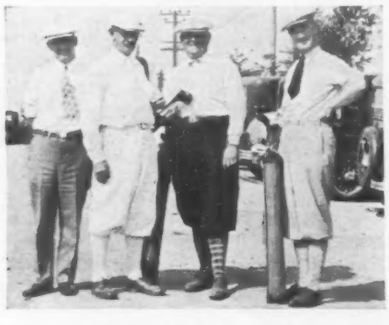
THE ADAMS AVENUE ELECTRIC COMPANY, of San Diego, is concentrating its efforts on the manufacture and erection of wrought-iron fixtures. It is doing a very good business, not only in its own territory, but in the better residential districts of San Diego, La Jolla and Point Loma. Individual design and manufacture at its own iron works plant gives it a good specialty business.

△

CONTRACT AWARDED—The C. H. E. Williams Company, Ltd., 509 Richards St., Vancouver, B. C., has been awarded contract for erection of the poles and heavy high tension insulators on the new transmission line of the Powell River Pulp & Paper Company, Powell River, B. C. The contract which was awarded by Stuart Cameron & Company, Ltd., general contractors on the project, also includes the stringing of the wires along the 14½-mile route.

△

High Safety Factor Here



L. W. Going, chief electrical inspector, Portland; J. B. Fisken, The Washington Water Power Company, Spokane; F. D. Weber, Oregon Iusurance Rating Bureau, Portland; and W. C. Mainwaring, Northern Electric Company, Ltd., Vancouver, and general chairman of the convention committee, about to take on a little golf after sessions of the Northwest Section convention

Los Banos Red Seal Home Pride of West Side

The Ledford home on Merced Road, just outside Los Banos, wired Red Seal and equipped with range, refrigerator, water-heater and air-heater wiring by W. L. Shumate of the West Side Electric Company of Los Banos. Mr. Shumate reports many Red Seal jobs and much residential and farm installation business in his district.

Approximate Figures if Any!

ARCHITECTS and builders are always asking for approximate figures on proposed wiring jobs. These cause the contractor much worry. At a recent meeting of the Bakersfield Electragists one member submitted the following definition of an approximate method of approximately figuring approximate wiring jobs, which ought to be approximately as good as any:

"To arrive at an approximate cost of a wiring job take the area of the entire floor plan in square feet, multiply by the height of the ceiling, divide by the number of doors and windows, subtract the number of rooms, then add profit, if any. This will give you a dependable approximate figure."

THE ROBINSON ELECTRIC COMPANY, Tom Robinson, proprietor, recently announced the removal of its office from 141 College Ave. to 136 North Van Ness Ave., Fresno, Calif. Mr. Robinson is prominent in the larger construction projects in the San Joaquin Valley.

△

WALTER E. BROTHERS, city electrician of Berkeley, Calif., was recently honored by the City Council of that city for having completed twenty years of faithful and efficient service. Congratulations were also extended to him by the I.A.E.I., Southwest Section.

△

PHOENIX (ARIZ.) representatives of the Electrical League of Arizona and of the I.B.E.W. are working together on a revision of the electrical rules for wiring of buildings in that city. R. W. Snyder, electrical inspector of the State Industrial Commission, is conferring with the two groups.

HAROLD L. GERBER, for the past few years actively engaged in industrial districts as electrical inspector for the department of electricity, San Francisco, recently opened an office at 110 Sutter St., San Francisco, where he will practice consulting electrical engineering, particularly of industrial installations. Mr. Gerber likewise has taught for the past year a school for electrical journeymen and helpers conducted by the I.B.E.W. in connection with the city schools. He has been a contributor to ELECTRICAL WEST on several occasions.

△

HERBERT G. UFER, it was announced recently by the Underwriters' Laboratories, has been appointed Western superintendent of the Laboratories with headquarters at 1014 Insurance Exchange Building, Los Angeles. In the announcement it was stated that Mr. Ufer would have "general direction of the business of the Laboratories in the Pacific Coast states and those adjacent to them and in British Columbia." Mr. Ufer has been active in Los Angeles as representative of the Laboratories for the past two years.

△

GEORGE L. BLACK, electrical contractor and engineer, of San Bernardino, Calif., recently removed his offices to 517 Andreson Building, San Bernardino.

△

And Still Going Strong

Two who make the merchandise go in San Luis Obispo: Stanley McFadden and Archie V. Cline, both of Cline's Electric Shop, San Luis Obispo, Calif.

Manufacturer & Distributor

Bethlehem Steel Subsidiary Operates Coast Properties

All the properties and business of the Pacific Coast Steel Company and the Southern California Iron & Steel Company, whose acquisition by the Bethlehem Steel Corporation was announced in the Jan. 1 issue of ELECTRICAL WEST, will hereafter be operated by the Pacific Coast Steel Corporation, a subsidiary of the Bethlehem Steel Corporation.

The Pacific Coast Steel Corporation also has taken over the entire selling organization of the Bethlehem Steel Company on the Pacific Coast and, in addition to selling the products of the newly acquired plants, it will sell the full line of iron and steel products manufactured at the Eastern plants of Bethlehem.

The executive and sales departments of the corporation will have their headquarters in the Matson Building, San Francisco, with sales offices also in Los Angeles, Portland, and Seattle. The treasury, purchasing and other departments will have their headquarters at Twentieth and Illinois Sts., San Francisco.

The principal officers of the Pacific Coast Steel Corporation are as follows: President—D. E. McLaughlin; vice-presidents—T. S. Clingan and Arnold Foster; vice-president and treasurer—E. B. Hill.

▲

MOVES HEADQUARTERS FROM SEATTLE TO PORTLAND—Samuel Wells, Northwest representative of the Chicago Flexible Shaft Company, has changed his headquarters from Seattle to Portland and now maintains his residence and business at 673 East Forty-Sixth St., North. He will continue to represent his company in the entire Northwest territory on Sunbeam Electrical Products and the Stewart Health Lamp.

△

GENREAL ELECTRIC VAPOR LAMP COMPANY is the name that was adopted Jan. 1, 1930, by the Cooper-Hewitt Electric Company, of Hoboken, N. J., a General Electric organization. The trade mark, Cooper-Hewitt, heretofore used, will be retained as the trade designation of the products manufactured by the General Electric Vapor Lamp Company.

△

A. S. FRASER, Seattle, has been named representative in the Seattle district for the Square D Company, succeeding R. D. Flatland.

ANACONDA WIRE & CABLE COMPANY of California has removed its San Francisco office and warehouse to 360 Ninth St. New buildings are being erected for the company in Los Angeles and Seattle. These will be ready for occupancy about March 1.

To Promote Electric Heat

THIS is the design chosen by the N.E.L.A. and the Electric Furnace Section of the N.E.M.A. for use in national advertising to further the use of electric heat in industry. The slogan, "Investigate Electric Heat," won first prize in a recent slogan contest sponsored by these two organizations. It is expected that central stations and manufacturers of electric furnaces and allied products will also use the design in their advertising.

LOCAL COMPANY TO REPRESENT WORTHINGTON PUMP — Announcement has been made by the Worthington Pump & Machinery Corporation, New York, that the interests of the corporation in the California territory will in future be served by a local company, the Worthington Machinery Corporation of California, Ltd., with headquarters in Los Angeles and San Francisco. H. D. Cornell, formerly president of the Worthington Machinery Corporation of Oklahoma, has been made president of the California company. George W. Hawkins, formerly director of sales of the parent company, is now vice-president of the California company. The Worthington Machinery Corporation of California, Ltd., has taken over the sales and engineering staff and the warehouse facilities of The Worthington Company, Incorporated in California.

General Cable Corporation Buys Peerless Brand

Purchase of the Peerless Insulated Wire & Cable Company, of Pennington, N. J., is announced by the General Cable Corporation.

The manufacture of the Peerless brand of weatherproof wire will be continued at Pennington under the personal direction of the former management, but the plant will hereafter be operated as a part of the Standard Underground Cable Company Division of the General Cable Corporation. The Peerless product will also be available through the other divisions of General Cable.

▲

1929 General Electric Orders Increase 28 Per Cent

Orders received by the General Electric Company during the year 1929 amounted to $445,802,519, compared with $348,848,512 for 1928, an increase of 28 per cent, President Gerard Swope has announced.

The orders for the fourth quarter of 1929 amounted to $108,398,049, compared with $88,160,049 for the last quarter of 1928, an increase of 23 per cent.

▲

SQUARE D ADOPTS THIRTEEN-PERIOD YEAR—The Square D Company, of Detroit, Mich., on Jan. 1 placed the handling of all its accounts, salaries and internal records on the basis of the new thirteen-period year. One of the advantages that the company expects to derive from the system is the possibility of comparing operating figures between periods without any adjustment as to time, since under the thirteen-period year there are exactly the same number of weeks and the same number of days in each period. The Square D Company some time ago put into effect a five-day week schedule.

△

HOWELL ELECTRIC BUYS JEANNIN MOTORS—The business of the Jeannin Electric Company, of Toledo, Ohio, has been purchased by the Howell Electric Motors Company, Howell, Mich. The equipment of the Jeannin company, which has manufactured a line of single phase and direct current motors, will be moved gradually to the Howell plant and added to the products of that company.

△

THE OHIO BRASS COMPANY, with general offices at Mansfield, Ohio, has opened a branch office in Seattle at 1218 Third Ave. J. W. Watkins is in charge.

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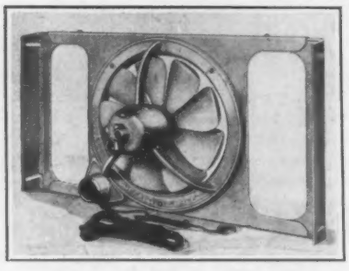
SANDOVAL SALES COMPANY, manufacturers' representative of San Francisco, has moved to new offices at 557 Market St.

New Equipment

Glass-Panel Window Fan



A new home kitchen ventilating fan announced by the Buffalo Forge Company, Buffalo, N. Y., is made with glass panels on each side of the fan so that daylight is not cut off in rooms with only one window or where the light is poor. The panel of this new Breezo fan is made in two sizes, the smaller to fit windows from 26 to 36 in. in width, and the larger size for windows from 36 to 46 in. Panels are shipped complete with fan and switch, but without glass, to the dealer, who may cut and install glass of suitable size according to the width of the window. The fan is quiet in operation, and when desired a reversible motor can be supplied at no extra charge.—ELECTRICAL WEST, Feb. 1, 1930.

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Electric Water Heaters

Electric water heating is made possible for homes of varying requirements by Finn tubular boiler type electric water heaters, manufactured by the Finn Heater Company, Detroit, Mich. The following types of Finn heaters are available to meet varying demands:

The Finn Type A, automatic, in 16- or 21-gal. size at $175, and in the 30-gal size at $200. Type "B," manually controlled, or switch-on, at $100 and $110, in the corresponding sizes. Type "D," for attachment to range boilers of 30- to 300-gal. capacity, automatic control at $80. Type "F," 3-kw. at $42, 4- and 5-kw. at $46, with two-heat snap switch control for replacement work on present range boilers or tanks. It is also made with a booster for excessive demand and known as Type "E" at $50. This type is normally operated on a flat rate for current, but when there is an excess demand for hot water the booster element is switched in by hand and the extra current charged for by meter.

Eight-wire heating elements on porcelain supports are used in each heater, the wires being fused together after the elements have been inserted in the boiler. The maximum rating of the heater only requires half the heating capacity of the wire, so that the heating elements have a practically indefinite service life and no trouble should be experienced with their burning out.

The tubular boiler, or heat reservoir, through which the water to be heated passes, is of heavy copper, brazed. It has 377 sq.in. of heating surface, the eight heating units extending the entire length of the reservoir, so that heat is applied to the water in contact with every part of the surface at once. A moderate, uniform temperature is thus secured, the even distribution minimizing lime or scale formation at any point, while the great range of expansion and contraction of the copper prevents scale from attaching itself to the metal. Hard water is accordingly no handicap to the use of these heaters. —ELECTRICAL WEST, Feb. 1, 1930.

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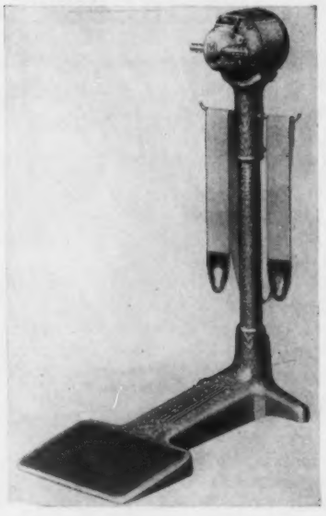
Floor Heater

A radical departure from the normal design of floor heaters is found in the Cochran heat unit No. 206 developed by

the Cochran-Detroit Company, Stephenson Building, Detroit, Mich. Instead of the usual parabolic reflector, this part of the structure is turned into a convex streamline base of the heating element, the object being to increase the convextion currents of air. On top of the base a standard spiral-wound porcelain core, drawing 6 amp., is mounted vertically. Around the heating element is a standard spherical guard made of heavy flat metal strips, spaced not more than 1 in. apart at the widest openings, and enclosing the heating element at a distance of not more than 2 in. The temperature of the heating element has been so regulated that the fire hazard is reduced to a minimum.

In this heater, the manufacturer explains, the vertical element throws out a wide band of radiant heat close to the floor, horizontally in all directions. A secondary radiant effect is secured by direct emanation from the heating element upward and downward and by deflection from the streamline base. The total height of the heater is 8 in.—ELECTRICAL WEST, Feb. 1, 1930.

Electric Exercisers



Two models of their Master Healthizer have been placed on the market by The Master Electric Company, Dayton, Ohio. Model 400 (illustrated) is a floor-type exerciser with pedestal and is direct driven by means of a 1/6-hp. totally enclosed repulsion induction motor. A 3-in. canvas applicator with hand grips sewn on and heavy leather loops offers a choice of three strokes. The retail price of this model is $79.

Model 300 is a table-type exerciser with the same features as the pedestal model and retails for $65.—ELECTRICAL WEST, Feb. 1, 1930.

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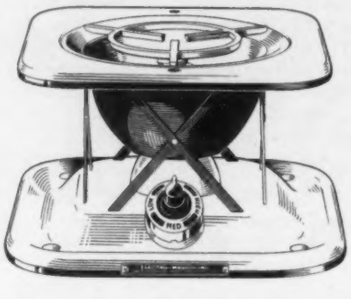
Electrochef Fire Bowls

Fire Bowl and Twin Fire Bowl, employing the heating principle used in the Electrochef, are now being manufactured by Electromaster, Inc., 1803 East Atwater St., Detroit. Fire Bowl, with a base 11⅝ in. square, has a single 1,300-watt unit. Twin Fire Bowl has two 1,300-watt units and occupys a space 21¼ x 11½ in. Either bowl will work on any household lighting circuit and can be obtained in a choice of black, white, green, blue, yellow or orange. List price of the single-unit fire bowl is $12.50; twin fire bowl, $22.50; separate electrocone heating element, $2; reflector, $2.—ELECTRICAL WEST, Feb. 1, 1930.



Magnetic Switch

Series KYR, a newly designed heavy duty magnetic switch, is announced as ready for distribution by the Diamond Electrical Manufacturing Company, 1318 East Sixteenth St., Los Angeles. Special features of the new switch include: Thermal overload relay adjustable to 80-120 per cent load, interchangeable thermal elements, entire Bakelite panel assembly easily removed by loosening four screws, no control wires to disconnect, ample wiring

space, concentric knockouts on four sides and back, and blowout coils for the higher ratings.—ELECTRICAL WEST, Feb. 1, 1930.

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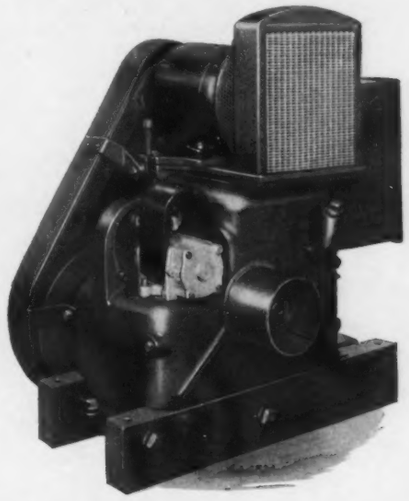
Small Unit Light Plant

A small self-contained light plant that supplies current economically for light auxiliary loads has been developed by Fairbanks, Morse & Company, Chicago. The plant comes in two sizes, 750 and 1,500 watts capacity respectively.

The generator is a ball-bearing machine mounted directly above the engine. The control mechanism, contained in the completely enclosed box mounted as a unit on the main frame, consists simply of a push-button start and a "high-low-belt" switch which permits the storage battery to be charged at a rapid rate for regular charges or a low rate for an equalizing charge. A variety of storage battery combinations makes it possible for the plant to meet almost any demand placed on the unit for either a 32-volt or standard 115-volt circuit. Either of the two sizes can also be furnished for direct lighting when it is desired to operate without the storage battery.



The plant is particularly adaptable for use on cranes, dredges and excavating equipment to supply the adequate illumination that is required on jobs which necessitate operation 24 hours a day. Another common use for a light plant of this nature is in connection with all marine installations, to supply light at such times as a boat is at anchor and power is not available from the main propelling unit. In isolated industrial plants, office buildings and hotels, the plant provides an economical source of power for light electrical loads during periods when the main generator is not in operation.—ELECTRICAL WEST, Feb. 1, 1930.

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Automatic Starter

A new counter emf. type automatic starter for small d.c. motors on general applications is announced by Cutler-Hammer, Inc., 153 Twelfth St., Milwaukee, Wis. Features of the new starter are its small size, reduced voltage starting, thermal overload protection, low voltage protection and renewable silver contacts. It is rated up to 2 hp., 115 or 230 volts. The contactors are designed especially for d.c. service and the renewable silver contacts insure long life. Each starter is supplied with a separate push-button master switch providing three-wire remote control. Two-wire control can be furnished if desired.—ELECTRICAL WEST, Feb. 1, 1930.

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Show Case Lighting Unit

A lighting fixture designed especially for mounting on the outside of show cases is being manufactured by the Benjamin Electric Manufacturing Company, Des Plaines, Ill. The new unit is intended particularly for lighting displays of foods, meats, cigars, candy and other perishable products which might be affected by the heat generated by lamps installed inside the show case.

The fixture is made up of reflector lamp sections and metal cover sections, with brackets and other fittings for attachment to the show case. It can be applied to either straight or L-type cases of any length. — ELECTRICAL WEST, Feb. 1, 1930.

Recent Publications

POWER FACTOR—A new system of solving power factor problems is described fully in a recent publication, No. GET-191, of the General Electric Company, Schenectady, N. Y. The system consists of laying down to scale the known factors and then scaling the unknowns, and a right-angle triangle with sides in proportion 3 to 4 to 5 is furnished with the booklet for use in making the calculations. Many problems are illustrated in the booklet as well as several solutions for one problem.

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"HOW THE JOBBER SALESMAN SELLS APPARATUS" is the title of a booklet published by the southwestern district office of the Westinghouse Electric & Manufacturing Company, East Pittsburgh. It deals with the problems encountered by electrical jobbers in selling non-merchandising apparatus in addition to their line of domestic appliances.

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GRINDERS AND BUFFERS—New features embodied in grinders employing asbestos protected motors and buffers for vulcanizing shops and polishing departments are the subject of a recent bulletin issued by the U. S. Electrical Manufacturing Company, Los Angeles.

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HIGH TENSION FITTINGS—Detailed information on bus supports and fittings manufactured by the Pacific Electric Manufacturing Corporation, 5815 Third St., San Francisco, is given in the company's recently issued Bulletin No. 30.

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FURNACE FANS—Fans for warm air furnaces are the subject of a new bulletin, No. 166, issued by the Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo. The Bulletin is addressed particularly to warm air furnace dealers.

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ELECTRIC WATER HEATERS—Sepco electric water heaters, manufactured by the Automatic Electric Heater Company, 1706 Race St., Philadelphia, are fully described in a 23-page booklet recently issued by this company.

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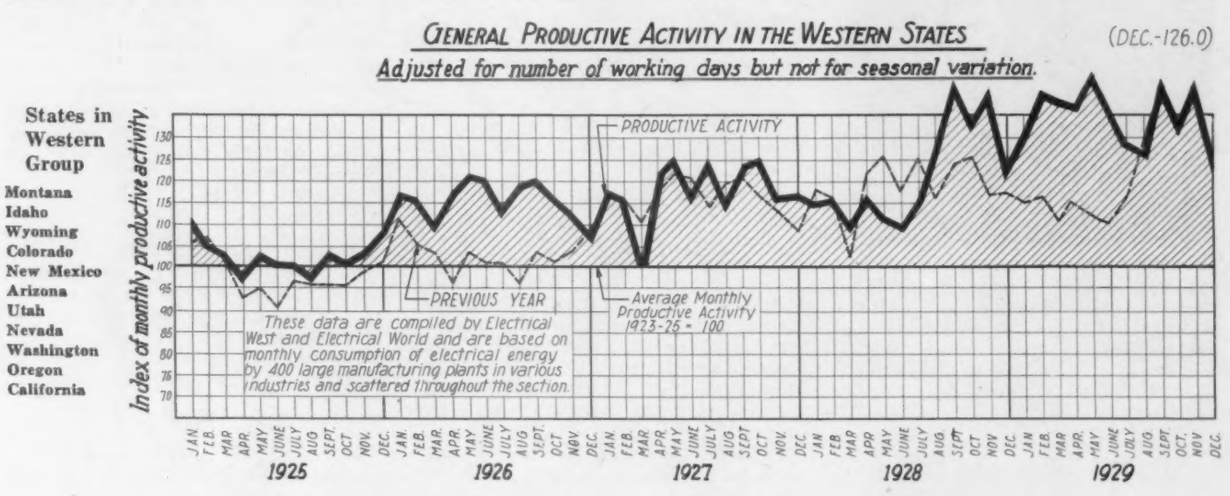
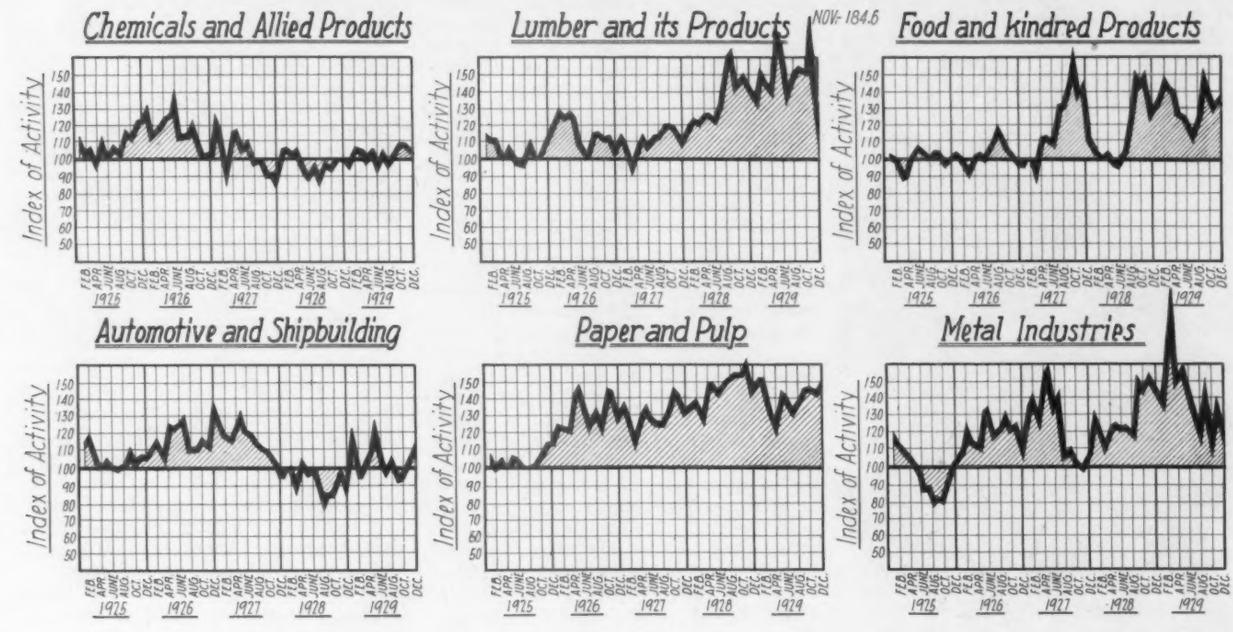
UNDERWRITERS' LABORATORIES REPORT —A review of the 1929 activities of the Underwriters' Laboratories, Chicago, has been published in mimeograph form and is being distributed to those interested in the work of this body.

ELECTRICAL WEST Barometer of Industrial Activity in Western States

REPORTS received on the consumption of electrical energy indicate that the manufacturing plants operating in the Western states witnessed a material drop in rate of activities during December as compared with November, but the drop between these two months is very close to the drop recorded during the same period last year. While the December rate of activity of these plants was 11.6 per cent under November, the December operations were still about 1.6 per cent over December, 1928. The manufacturing plants in the Southern and Western states were the only ones closing the year with a rate of operations over those of December, 1928.

Operations in the lumber industry were materially curtailed during December, practically every reporting company indicating a decided drop in productive operations. A drop is to be expected at this season of the year, but the current drop is much more than normal for the season. The December rate of lumber operations was 28.4 per cent under November, and 8 per cent under December, 1928. In fact the December rate of operations in this industry was the lowest since June, 1928.

On the other hand, the food products industrial group reported an increase in operations of 5.7 per cent over November, and was still operating during December on a plane 19.8 per cent above December, 1928.

Indexes of Industrial Activity in the Western States
(All figures adjusted for number of working days.)

	Dec. 1929	Nov. 1929	Dec. 1928	Average 12 mos. 1929	Average 12 mos. 1928
All industry	126.0	142.6	124.0	135.5	123.2
Chemical and allied products	106.0	109.7	99.7	100.5	96.9
Food and kindred products	138.8	131.3	115.9	135.4	119.4
Lumber and its products	132.3	184.6	143.8	154.6	137.5
Metals group	121.0	141.7	144.0	148.3	131.9
Paper and pulp	150.3	144.8	141.0	142.5	147.2
Rubber and its products	100.0	137.0	142.8	176.7	154.1
Shipbuilding	113.4	107.1	85.3	101.9	89.4
Stone, clay and glass	102.9	121.0	128.5	137.2	140.2